AUGUST 20, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

✔ Atomic Planes Are Close —page 116

✔ Imports Hurt Fastener Makers —page 153

So, You Want To Be a Mill Customer?

A telephone call isn't enough. You'll have to sell the mill on your qualifications. Here's how . . . page 76

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"SPEEDWALK"* SYSTEM HANDLES MASS MIGRATION DAILY

To speed commuters from tube trains to surface lines at Jersey City, New Jersey, the Hudson & Manhattan Railroad installed a passenger conveyor capable of moving 10,800 passengers hourly.

Built by Stephens-Adamson Mfg. Co. and Goodyear Tire & Rubber Company, the Speedwalk* system travels 227 feet at 120 feet per minute on spun rollers formed from B&W Electric-Resistance-Welded Steel Tubing. On their weary homeward journey passengers ride up a 10 percent grade, formerly known as "cardiac climb", for the first 137 feet.

Because of its known characteristics, the choice of B&W Tubing was natural for this service.

If you plan to design or build equipment requiring tubing . . . seamless or welded . . . carbon, alloy or stainless steel . . . for pressure or mechanical use, send for Mr. Tubes. He can aid you in selection and help you get the most for your money. *Or write for Bulletin 361.* The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

*Trade-Mark

TA-5057(M)

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

New Strength and Safety for the "Second Greatest Show on Earth"

When P. T. Barnum rode the fabulous cog railway up New Hampshire's 6288-ft Mount Washington, he dubbed it "the second greatest show on earth." Every summer, some 35,000 riders tend to agree.

The locomotives chuffing stubbornly to the summit look like museum pieces, and the right of way is somehow reminiscent of a roller coaster at an amusement park. Yet from the time the line started nearly ninety years ago no passenger has lost his life.

The line jealously guards this safety record, and this summer is placing in service a spanking new coach, its first all-metal one. With emphasis on lightweight construction, the car will have an underframe built of Mayari R high-strength low-alloy steel. With a yield point a good deal higher than that of carbon structural steel, the Mayari R frame members can be much lighter and still provide all the strength that will ever be needed.

This is an off-the-beaten-track example of Mayari R's value in railway, automotive, structural and general manufacturing use. Mayari R is unusually strong, is unusually paint-adherent, and unusually resistant to corrosion and abrasion. It can be welded and worked as readily as carbon steel. Catalog 353 explains it in detail, and shows dozens of interesting applications. You can get a copy through our nearest sales office.

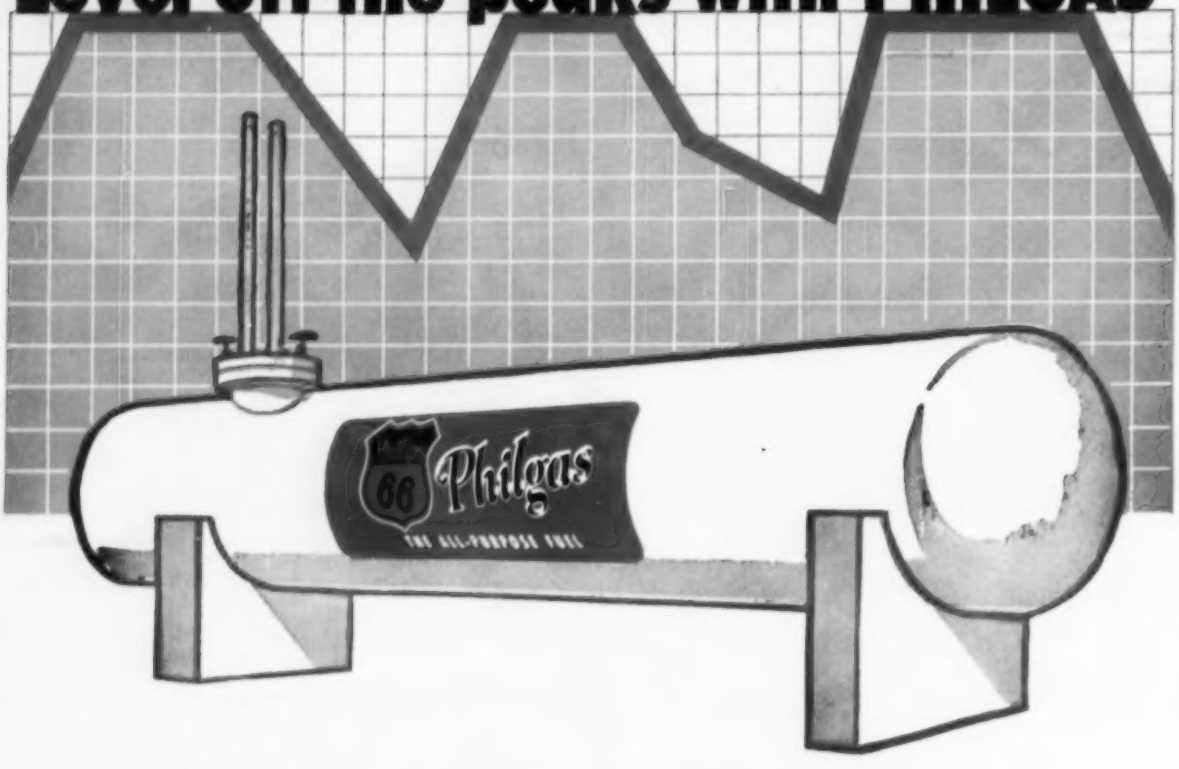
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R...High-Strength, Corrosion-Resisting Steel

Level off the peaks with PHILGAS*



Avoid high demand charges for gas by installing your own

STANDBY PHILGAS *SYSTEM*

Peak-shaving with a standby Philgas system is like having your own gas well. You can put Philgas into operation without delay when your gas needs threaten to exceed your contract limitations for natural or manufactured gas. Installing a Philgas system is easy and requires little capital investment. It is automatic in operation.

Philgas . . . America's largest selling LP-Gas . . . is an exceptionally clean fuel with no harmful contaminants. It is a Phillips Petroleum Company product, manufactured to rigid standards of quality and uniformity. You can't get a better fuel for heat treating, space heating, or powering trucks and heavy duty equipment. Full information on request.

*PHILGAS is the Phillips Petroleum Company trademark for its high quality LP-Gas or bottled gas (propane, butane).

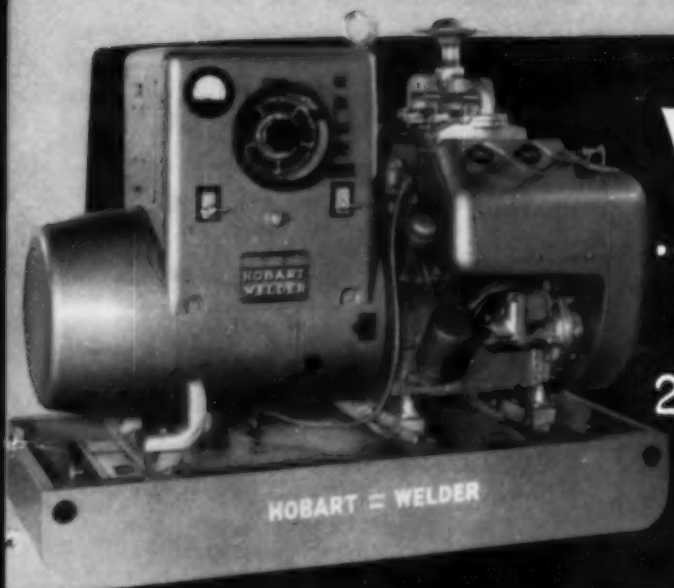
Phillips 66 Philgas
THE ALL-PURPOSE FUEL

PHILLIPS PETROLEUM COMPANY

Sales Department · Bartlesville, Oklahoma

Offices located in

Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Houston, Tex., Indianapolis, Ind., Kansas City, Mo., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., Salt Lake City, Utah, St. Louis, Mo., Tampa, Fla., Tulsa, Okla., Wichita, Kans.



WELD!

...or operate tools, lights, motors with this popular light-weight, easy-to-use

2 in 1 combination ARC WELDER and POWER generator

HOBART ELECTRODES and WELDERS

SPEEDS WORK...AVOIDS DELAYS! SAVE HUNDREDS WITH THIS AC/AC ON THE JOB

Here's a valuable tool that lets you do welding right on the job—repair work that eliminates delays, teardowns and costly replacement parts—steel fabrication and erection, reinforcing, piping or special equipment installations—plus the extra advantage of being able to operate tools, lights, motors, etc., independent of outside power lines. Here's a new AC Welder/AC Power Unit that is easy to use, easy to move about, and ready on a moment's notice to go to work for you.

Lets your own men handle jobs much faster and easier just when you need your equipment most. Hobart's extra built-in features make this new AC/AC combination one of the most important pieces of equipment you can have on the job. It will pay you to get complete information, no obligation. Simply fill out and mail the coupon below to: **HOBART BROTHERS COMPANY, BOX ST-86, TROY, OHIO or phone 21223** • *one of the world's largest builders of electric arc welding equipment.*

There's a HOBART best suited for your particular work!

HOBART TROY OHIO WELDERS

Try HOBART'S **new and better** ELECTRODES

There's a size and type for every welding application. All Hobart electrodes are precision made, rigidly inspected and tested to assure uniform high quality. They are always the same—your guarantee of better, faster welds at lower cost. Ask for catalog on complete line.

HOBART BROTHERS COMPANY
BOX ST-86 TROY, OHIO

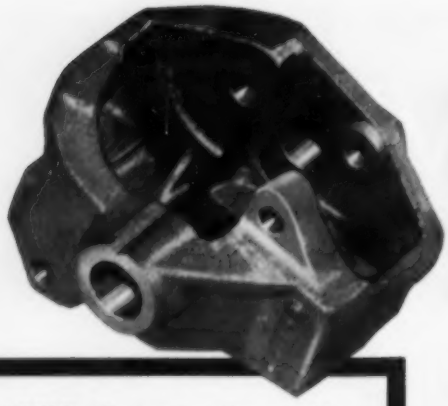
☐ Tell me about the AC Welder/AC Power combination in—
☐ Stationary ☐ Portable
☐ Also send information on _____ capacity
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

Name _____

Address _____

City _____ State _____

☐ Mail catalog on complete line of electrodes.

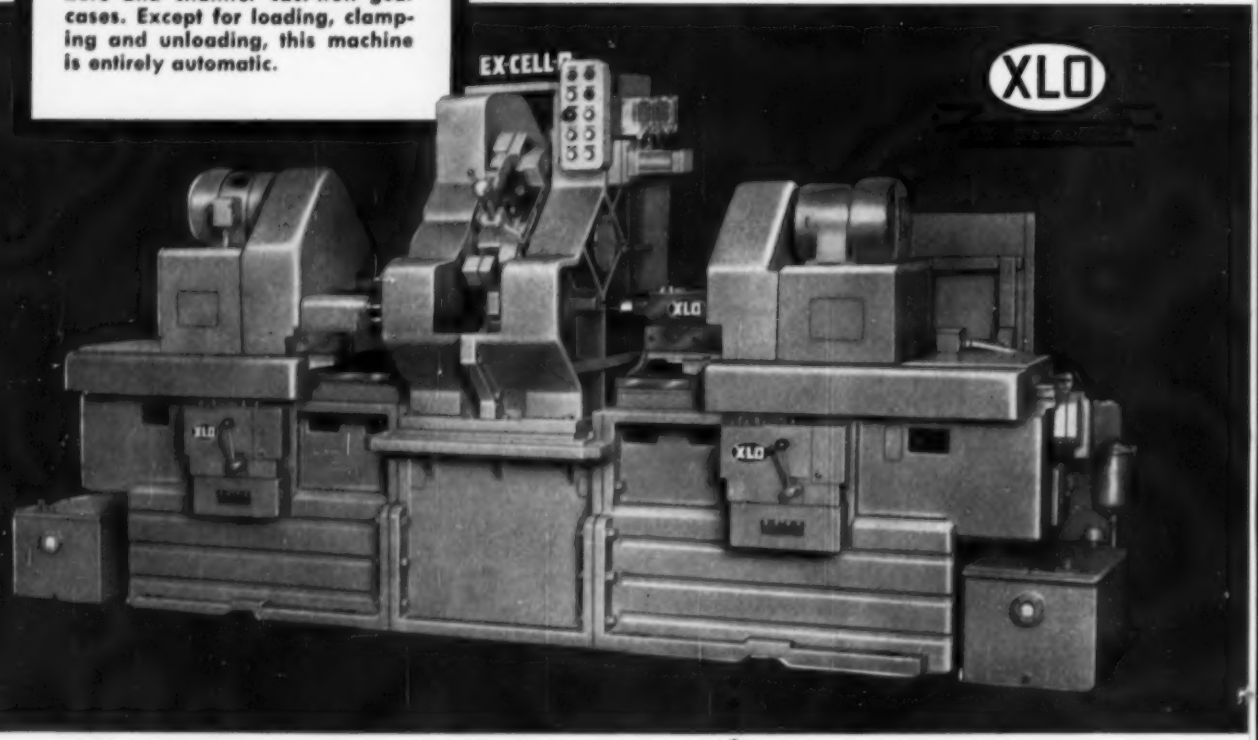


New Ex-Cell-O 2-Way Machine

speeds gear case production, lowers cost . . .

ABOVE: Gear case after machining. Hole sizes are held within .0005", centers .001".

BELOW: New Style 54-A Precision Two-Way Machine equipped to bore and chamfer cast-iron gear cases. Except for loading, clamping and unloading, this machine is entirely automatic.



Typical of Ex-Cell-O's constant improvement in the field of precision production is this new Style 54-A Two-Way Precision Boring Machine.

Operations on the cast-iron gear case illustrated include finish boring seven holes and chamfering diameters at two points. With its new hydraulic control panel each way unit has a greater range of feeds and a higher rate of rapid traverse.

Like all standard Ex-Cell-O Machines, the new 54-A is easily adapted at slight cost to a variety of precision setups. For further information, contact the Ex-Cell-O representative in your area, or write, wire or phone direct to Ex-Cell-O, Detroit.

EX-CELL-O

CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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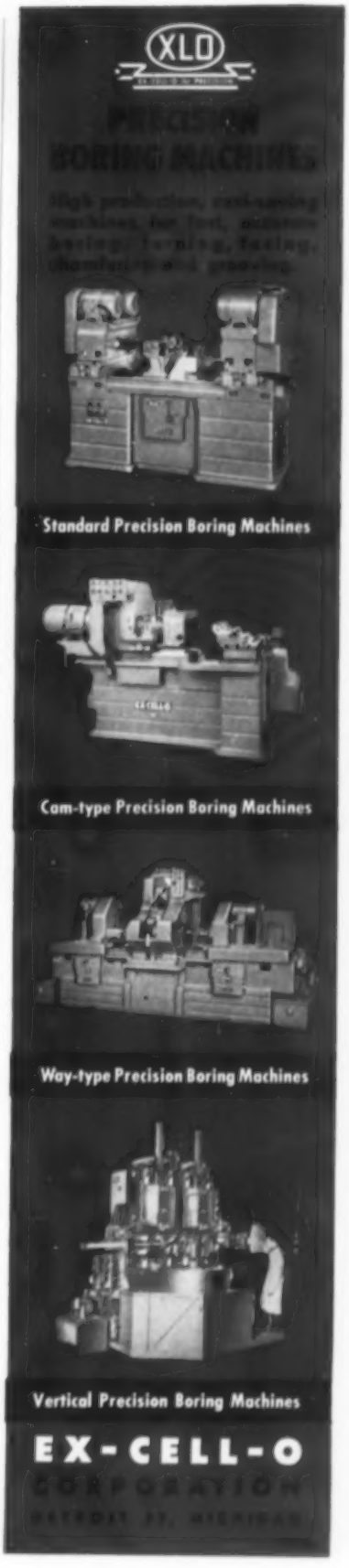

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that damages your machines and hurts company morale

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TORIT DUST COLLECTORS
trap dust at its source!

Untrapped dust costs you money, "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-the-building) system. Torit unit operates only when machine or combination of machines it protects are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to... DEPT. 506.

TORIT MANUFACTURING COMPANY

Sweet's

311 Walnut Street
St. Paul 2, Minn.

behind the scenes

Rating a Customer

How to become a steel mill customer is the theme of the article that starts on page 76. Well, you might say, to become a steel mill customer, you simply go to the mill and tell them you wish to become a customer, and what's so unusual about that?

Ah, but it isn't that easy, Jack. Many metalworking manufacturers, by reason of the volume of steel they consume, may be qualified to become steel mill customers, but simply calling and saying "shake hands with a new customer" isn't going to land them on the steel mill books. Some steel buyers aren't sure whether they should continue as steel warehouse customers, or become direct buyers, and it is to these "in-between" consumers that STEEL's cover story is directed.

Steel mill management is not particularly disposed to turn handsprings when buyers step up and order a few coils of wire, two or three bars, a roll of strip or a handful of sheets. Elation is reserved for the appearance of the steady, heavy consumer, the one with the A-1 credit rating and the solid reputation.

West of the Moon

At the semiannual meeting of the American Rocket Society in Cleveland, Krafft A. Ehricke, chief of preliminary design and systems analysis, Convair, a division of General Dynamics Corp., San Diego, Calif., described a new conception of a solar-powered space ship.

"The enormous cost of supplying space-borne vehicle systems from the earth is one of the principal restrictions in space flight with chemically powered propulsion systems," Mr. Ehricke began, and the meeting was off and running. The rocket boys pricked up their ears when the speaker urged the use of solar power to eliminate the necessity of carrying fuel loads from the earth.

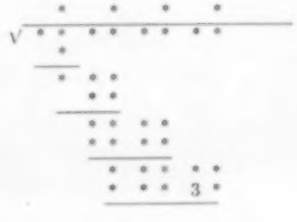
The proposed ship would have two polyethylene terephthalate plastic bags 128 ft in diameter, with a 17 ft liquid hydrogen tank and a crew's gondola slung between them. The sun would heat the gas in the bags, which would power the motor, which would then thrust an exhaust and drive the double balloon all over God's heaven.

Can't you see the aviation enthusiast of tomorrow rushing off to pick up his girl? Tying his craft to the nearest cottonwood tree, he will open his gondola door, tip his hat and sing:

Ah, come, Josephine, we won't need gasoline
In my flying twin bags made of plastic;
When we hit outer space (which will soon be the case)
Let's be glad that the bags are elastic.
Ah, yes, Josephine, in my flying machine
We will circle the moon as we test 'er;
And if comets come near us, there'll be nothing to fear, as
They should bounce from our tough polyester.
Ah, but if, Josephine, never more we'll be seen
On the earth where we first started dating,
You'll be with me, my lass, 'twixt two bubbles of gas
In the heavens forever rotating.

Cryptic Square Root

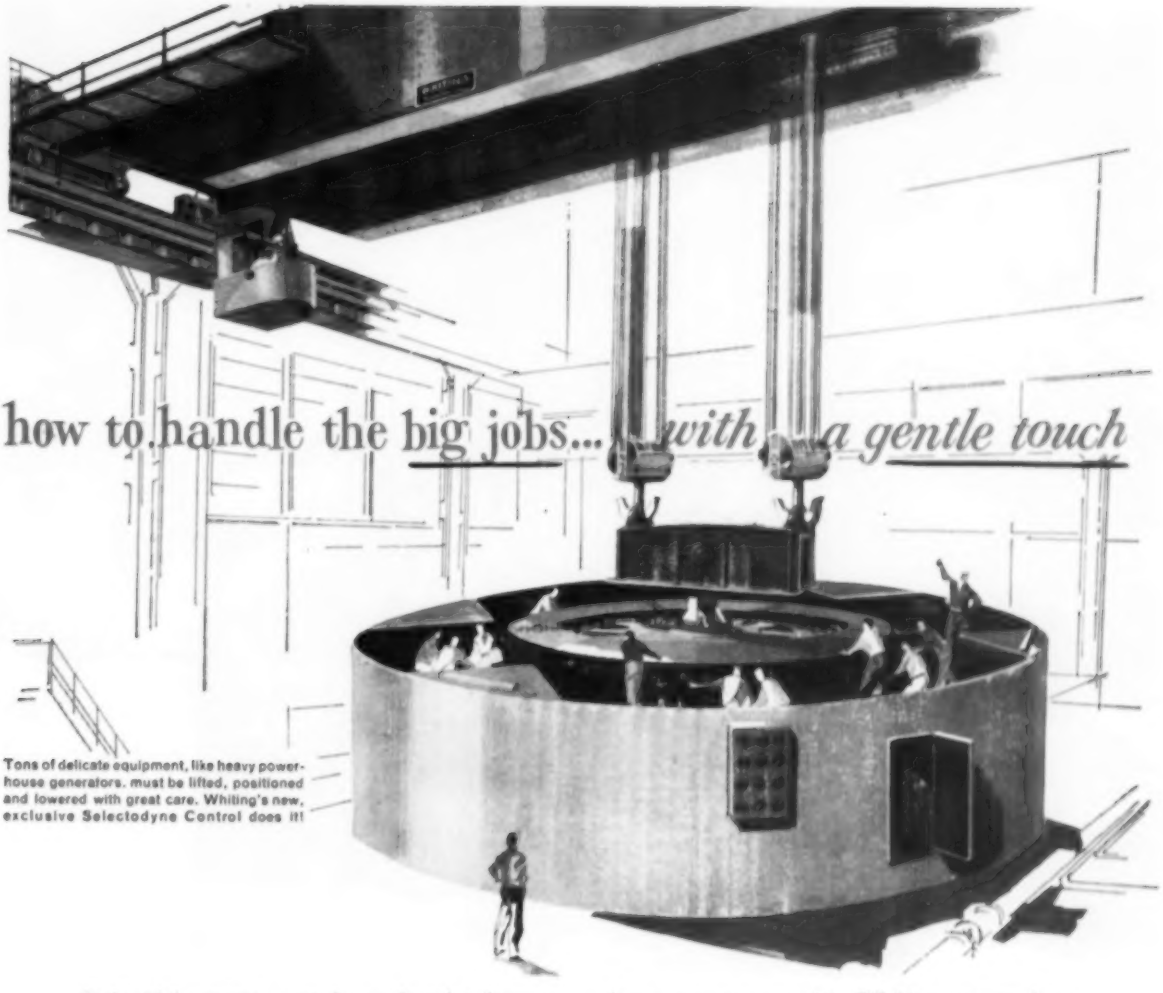
Here is possibly the meanest trick we ever pulled. A little man with pointed ears dropped the following note on our desk and scuttled back to his retreat under a rock in the park across the street. We pass it on: Every missing digit in this example of extraction of square root can be correctly inferred from the way it is set up.



Shrdlu

(Metalworking Outlook—Page 67)

how to handle the big jobs... with a gentle touch



Tons of delicate equipment, like heavy powerhouse generators, must be lifted, positioned and lowered with great care. Whiting's new, exclusive Selectodyne Control does it!

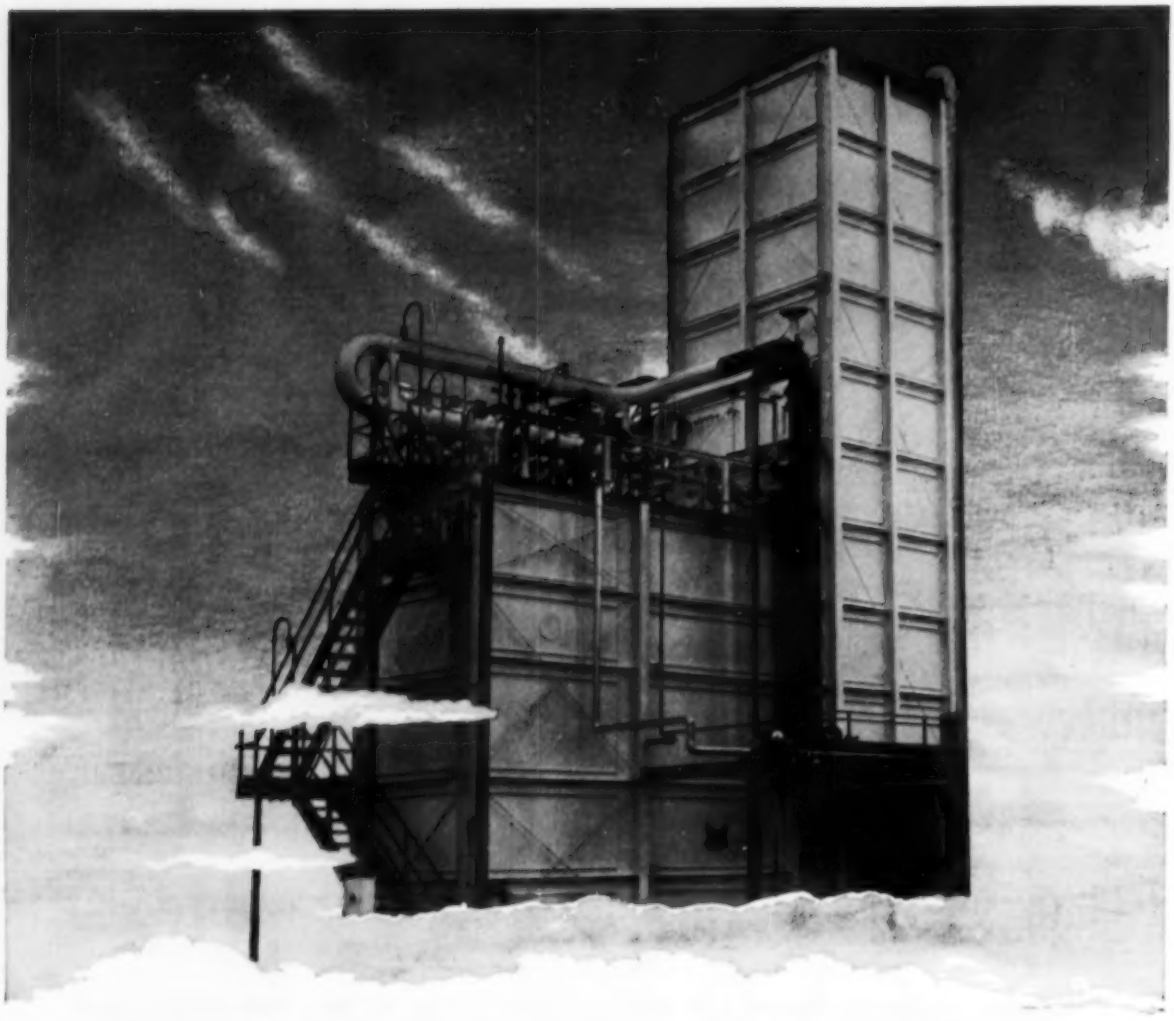
Industrial management demands a lot from a crane. Rightly so, because a crane represents a major investment. This is why men with many of the nation's largest industries talk over their crane requirements with Whiting engineers before planning plant expansion or crane replacement. After considering all facts, they often choose Whiting Engineered Travelling Overhead Cranes. Why? . . . facts like these: Whiting has over 70 years experience in designing cranes for every type of industry—from power to paper. Whiting cranes permit greater handling precision for large or small loads . . . from one ton to 450. Whiting cranes keep returning the investment because of their remarkable endurance and extremely low maintenance. It's good business to consult Whiting on your crane requirements.

Heavy handling costs less with a Whiting Crane and our Bulletin No. 80 tells why. Write for it today! If you specify, we will also send interesting crane case studies.

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

▼ Fifty-ton capacity Whiting Overhead Crane moves giant press to final assembly area in Danly Machine Specialties, Inc. plant.

This 15-ton capacity Whiting Overhead Crane is in constant use unloading heavy steel plates for Midland Steel Products Co. ▼



This plant's stockpile is worth millions--

yet it doesn't cost a cent!

The "wild blue yonder"—the free and limitless atmosphere—is the stockpile for Air Products Oxygen (and/or Nitrogen) Generators. There are no delivery problems for this inexhaustible raw material. There are no price fluctuations and no shortages to trouble the owners of these plants.

The method is basic. The production of oxygen and nitrogen from air is accomplished by "Low-Temperature Processing". The air is liquefied by refrigeration and the nitrogen is drawn off at its boiling point (fractional distillation) leaving the pure oxygen product.

Your own "On-Location" Generator can provide you with a continuous supply of oxygen regardless of your requirements—including moderate to large tonnage users. We will furnish and install a complete facility at no capital investment on your part—on a lease basis including a purchase option. If you prefer, we will operate and maintain the facility and guarantee your oxygen savings.

Send us details regarding your requirements and expected future needs. We will then give you a realistic estimate of the savings you can expect with an Air Products Generator installed in your plant.

LOW COST
OXYGEN-NITROGEN

Air Products
INCORPORATED
Dept. N Box 538, Allentown, Pa.

More than 800
successful installations

You can't afford "mistaken identity" on your production line!

It's hard to believe that the wrong metals get into production so often, and even worse, into finished products. Yet the causes of such mistakes are usually very simple.

Errors are made in shipping or metal stocks are mis-identified. Errors occur in processing, too. Accidental mixing of hardened and unhardened parts of similar appearance is common.

No matter how sly their origin, these undetected situations inevitably get out of hand and into cost figures. Tools are damaged; production time is lost. Parts pile up in scrap, or worse, get by inspection and fail in the hands of the customer.

New Brush METAL MONITOR takes the guesswork out of metal identification.

Most plants are surprisingly susceptible to these cases of "mistaken identity" which cost millions of dollars every year. *But now these wastes can be eliminated!*

New Shop Tool Identifies Metals

Brush Electronics offers a new instrument, the Brush METAL MONITOR,* which will detect variations from approved metal specifications at any stage of processing. It works on ferrous or non-ferrous metal, is nondestructive, won't mar finished surfaces. And it's portable, easy to use. Any worker can check any metal anywhere in the shop. The METAL MONITOR prevents losses due to the use of the wrong metals.

How It Works

Metal checks are easy to conduct. The METAL MONITOR probe is held momentarily on a sample of metal known to have the desired structure and composition and the operator obtains an immediate reading. He then holds the probe on the piece to be checked. If the reading is the same, the metal is the same . . . if the reading varies, it's the wrong metal.

Write for this introductory booklet on the new Brush METAL MONITOR now!

To get the complete facts about this fast, accurate instrument, send for your free copy of a brand-new booklet. It describes the Brush METAL MONITOR in detail, explains how it will save money for your company.

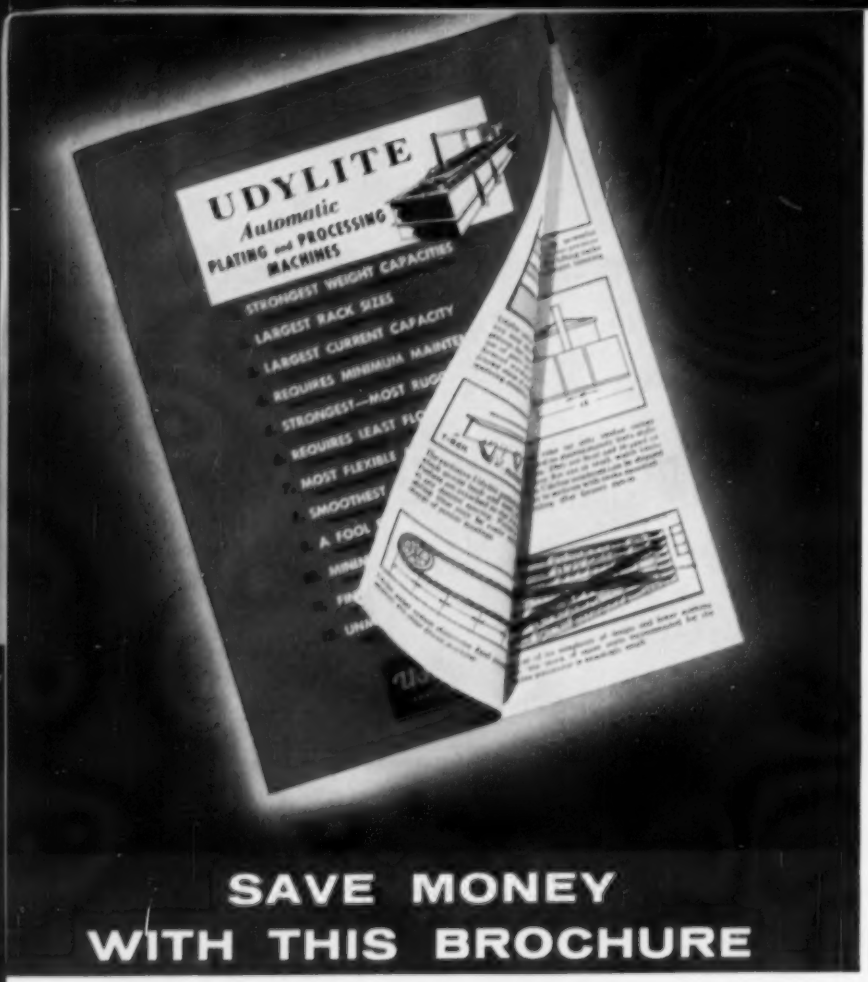
*T.M.

BRUSH ELECTRONICS COMPANY

3501 Perkins Avenue, Cleveland 14, Ohio

BRUSH 6 ELECTRONICS

DIVISION OF CLEVITE CORPORATION



SAVE MONEY
WITH THIS BROCHURE

Get the facts you should know about Automatic Plating Machines

Let us show you how Udylite Full Automatics give you more production plating per square foot. How racks of extreme depth can be used. How lifting, horizontal movement and lowering of racks is done smoothly, without jar or jerk by hydraulic power with *separate speed controls for each* movement. Why Udylite machines can be shipped by rail or truck, assembled on their own base and with tanks mounted, saving valuable erection time in your plant. And, many other factors to check before the purchase.

It is yours for the asking—write for your copy today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST
PLATING SUPPLIER

LETTERS
TO THE EDITORS

Quality Control Promotion

The article, "Quality Control Charts Plating Savings" (July 23, page 90), is of interest to me. Part of my responsibility is to promote quality control. One of the means of accomplishing this is to circulate pertinent information.

I am writing for permission to reprint 60 copies of this article. They will be given to responsible people in the Deere organization.

L. K. Vollenweider
Manager-Quality Control Department
Deere & Co.
Moline, Ill.

• *Permission is granted.*

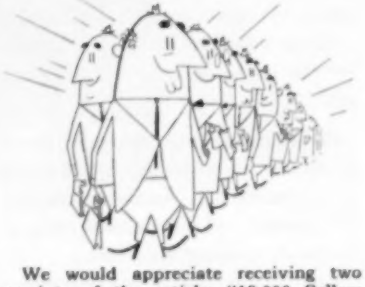
Editorial in Monthly Letter

Having received two suggestions in one day that your editorial, "Labor: New Fixed Cost" (July 16, page 79), be reprinted in our monthly letter, "Clover Business Letter," I am writing to ask if you would object to our use of it.

C. J. Fairhurst
Clover Mfg. Co.
Norwalk, Conn.

• *We are glad to grant you permission.*

Sellers for Hire



We would appreciate receiving two reprints of the article, "19,000 Sellers for Hire" (July 30, page 59). This article is of considerable interest to us.

L. J. Lieberman
Product Manager-Algrip Sales
Alan Wood Steel Co.
Conshohocken, Pa.

We would appreciate six reprints. It is an extremely interesting article, and we wish to show it to our suppliers.

Peter G. Kingsmill
Sales Service
Peckover's Ltd.
Toronto, Canada

Impressed with Article

We were impressed with your article, "How To Live with SUB" (July 16, page 121). I would appreciate 12 additional copies, so that we might pass along the information.

J. L. Pritchard
Personnel Assistant
Aro Equipment Corp.
Bryan, O.

Articles Aid Foreman

Thank you for the reprints of the recent six-article series, "Temperature Control of Heat Treating Furnaces."

Since we have over 150 temperature controls in our plant, I requested these articles for our instrument maintenance

(Please turn to page 12)

A. P. GREEN
KX-99

In . . .
Complete Blast Furnace Linings
Hot Metal Mixers
Hot Metal Cars

Resist Carbon Monoxide Disintegration . . . Slag Action . . . Chemical Action and Abrasion

Fifteen leading steel companies have proved KX-99 Blast Furnace Brick in service. KX-99 were developed to meet the service requirements in the Steel Industry and are recommended for Complete Blast Furnace Linings, Hot Metal Mixers and Hot Metal Cars.

Check These Outstanding Properties of KX-99

1. **Special high fired, Missouri super duty brick.**
2. **No sign of carbon monoxide disintegration in 1000 hour test at 900°F.**
3. **Apparent porosity in the range of 8 to 12 per cent with an average of 10 per cent.**
4. **Bulk density in the range of 2.30 to 2.40 grams per cubic centimeter.**
5. **Average modulus of rupture 1800 to 2500 pounds per square inch.**

For detailed information on service and specific recommendations—contact your local A. P. Green Representative or write

A. P. Green REFRACTORY PRODUCTS

KX-99 Blast Furnace Brick are manufactured to extremely close tolerances . . . uniform in dimensions . . . free from warpage.

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PLANTS: Mexico, Mo., Woodbridge, N. J., Sulphur Springs, Texas
In Canada:
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Toronto 15, Ontario

A COMPLETE LINE OF FIRE-CLAY REFRACTORIES

ONE OF THE GARLOCK 2,000

Competitive Materials

Chart shows loss of thickness after alternating wet and dry exposure tests. Garlock 662 returns to within 1% of original thickness. No. 662, made from a cork paper base impregnated with a synthetic rubber, is dimensionally more stable than (A) beater process sheet with synthetic rubber binder, (B and C) sheets saturated with glue-glycerine binder.

GARLOCK 662 GASKET MATERIAL does not shrink or change shape

Here's convincing proof that gaskets of Garlock 662 can stand varying climatic conditions without drying, shrinking, or hardening. The gaskets illustrated were subjected to a 24 hour alternating wet and dry test for weeks, then conditioned at room temperature. As the photo and chart at right show, 662 gaskets returned to their original shape and to within 1% of their original thickness. Competitive types hardened, twisted, and shrank as much as 8%. No wonder so many companies are specifying 662 for use against gasoline, water, and oil at temperatures up to 300°F. It is approved by Underwriters' Laboratories, Inc. for use against hazardous liquids.

And longer-lasting 662 Gasket material is only one of "the Garlock 2,000" . . . two thousand styles of gaskets, packings, and seals to meet all your needs. It's the only complete line. It's one reason you get unbiased recommendations from your Garlock representative. Call him today or write for Bulletin AD-146.

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, *contact one of our 30 sales offices and warehouses throughout the U. S. and Canada.*

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints

LETTERS

(Concluded from page 10)

man and myself. Few articles of this type are published. I found them interesting and informative. All the articles helped in our operations.

Harold W. Nelson
Foreman-Heat Treat Department
National Lock Co.
Rockford, Ill.

Data for Cost Saving

We could use six more tear sheets of the article, "Save with Shaped Wire" (July 16, page 132). It provides excellent data for both metal and cost savings.

J. J. Ryan
Sales Manager-Wire Products
United Wire & Supply Corp.
Providence, R. I.

Excellent Handling of Subject

Your article, "Do You Fit in Prefab Picture?" (July 11, 1955, page 55), was interesting and useful to us. May we compliment you for the excellent way you handled a subject which is becoming of increasing concern to steelmakers and fabricators.

We are undertaking studies on the processing of light steel products, especially light gage structural sections, from strip by the cold forming method. We are interested in statistics on output, production capacity and information concerning the application of light structures and their future development and expansion plans.

Do you know of any such statistics, or are you able to inform us from whom we may obtain them? We would also appreciate the address of the Prefabricated Home Manufacturers Institute.

N. Ozawa
Branch Chief-Planning Section
Nippon Kokan Kabushiki Kaisha
Tokyo, Japan

• *We do not have these statistics. Perhaps you can get something of this nature from the Prefabricated Home Manufacturers Institute, 908 20th St., Washington 6, D. C. Harry H. Steidle is the manager. The article, "Rolling Mill for Roofs and Floors" (July 30, 1956, page 96), concerns the cold roll forming of light structural forms.*

Interested in Honeycombs

We noted your article, "On the Threshold of a Boom" (June 11, page 112). We here at Emerson are interested in this application and would appreciate three copies.

J. J. Janca
Assistant Methods Engineer
Emerson Electric Mfg. Co.
St. Louis

Effect of Steel Settlement

We should like to get a full picture of just what the steel strike, its settlement and the subsequent increase in wages will do to the price of consumers' goods. No doubt in some future issue you will discuss these economic consequences. We would appreciate your letting us know when such an article appears.

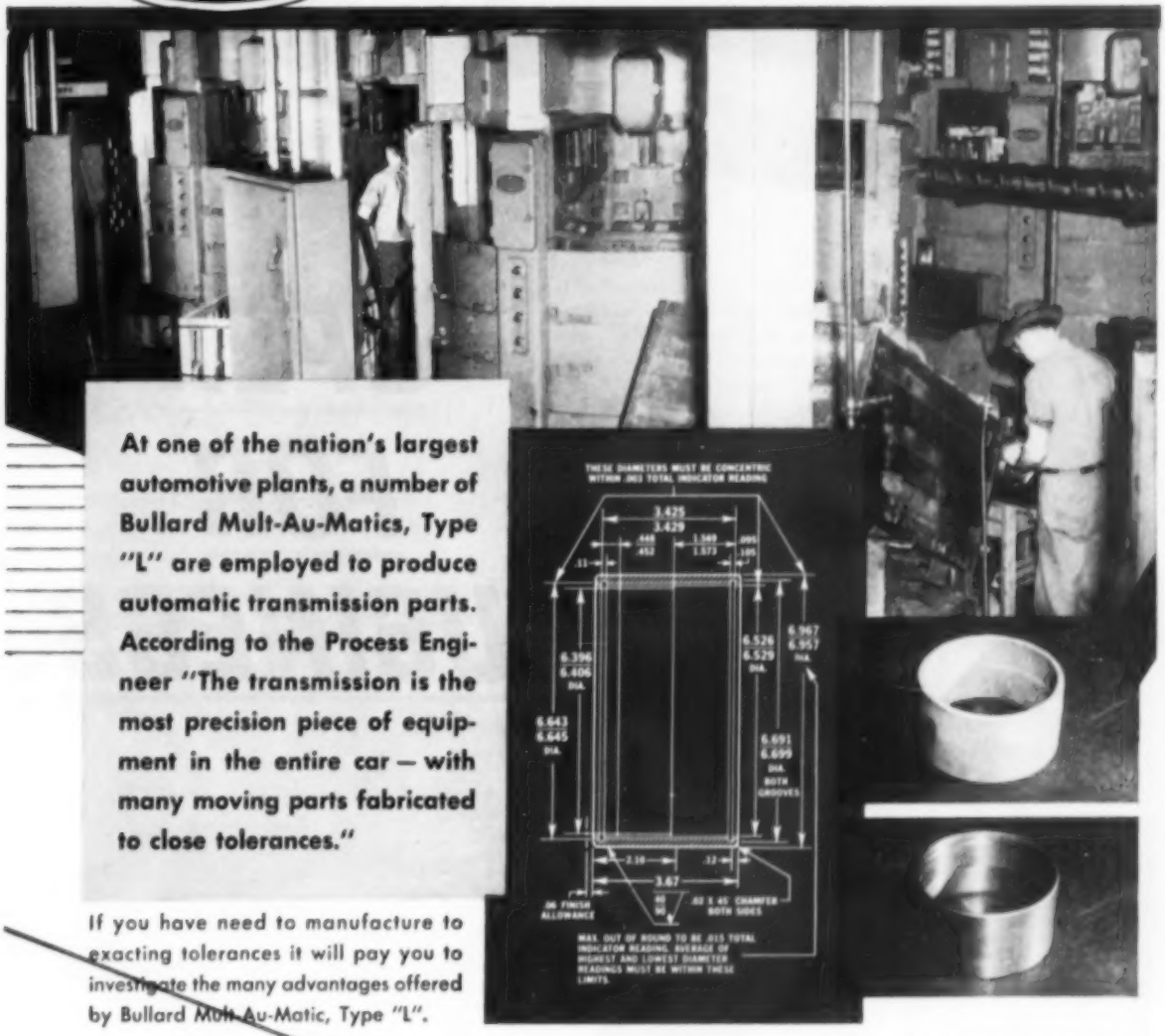
M. C. Phillips
Consumers' Research Inc.
Washington, N. J.

• *See the editorial, "Moderation in Steel" (page 47), and the article, "3-Year Price Pattern Set?" (page 49), in the Aug. 13 issue.*

Automobile Manufacturer produces

Repetitive Pieces to Close Tolerances with

BULLARD MULT-AU-MATIC Type "L"



At one of the nation's largest automotive plants, a number of Bullard Mult-Au-Matics, Type "L" are employed to produce automatic transmission parts. According to the Process Engineer "The transmission is the most precision piece of equipment in the entire car — with many moving parts fabricated to close tolerances."

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New refractories plant at Columbiana, Ohio, to give better-than-ever service to the steel industry!

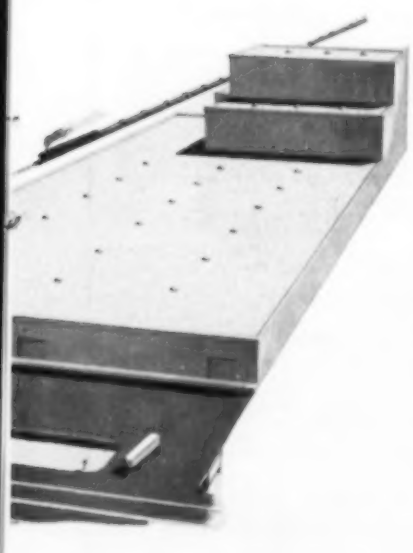
THE NEW Kaiser Chemicals refractory plant at Columbiana, Ohio has now begun production of steel furnace refractories.

Located on a 100 acre site adjacent to the main line of the Pennsylvania Railroad and the Ohio-Pennsylvania Turnpike, the new Columbiana plant assures rapid rail and truck transportation to steel producers in the Midwest and East.

Already serving the nation's steel industry from three plants in California, this new *Kaiser Chemicals* facility means new production to meet the increasingly heavy demand for Kaiser refractories. The new Columbiana plant will manufacture basic brick, mostly of the Periclase Chrome and Chrome Periclase types in addition to Permanente Ramming Mixes for refractory furnaces.

All these refractories are *especially designed* for peak performance in specific applications in open hearth and electric steel furnaces. In fact, for more than 12 years Kaiser Periclase Chrome and Chrome Periclase Brick have *set the standard* of performance for the industry. *That is why more and more steel producers regard them as the most dependable refractories available today!*

If you have a problem in your mill which might be solved by the *prompt delivery of superior quality, dependable refractories,* why not get in touch with us?



For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. S6112.

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Model HN for 10 gauge Stainless Steel and 8 gauge Mild Steel. 6" radius.

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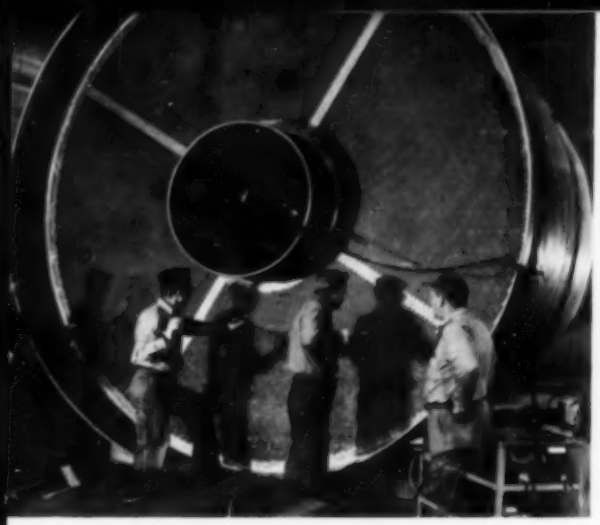


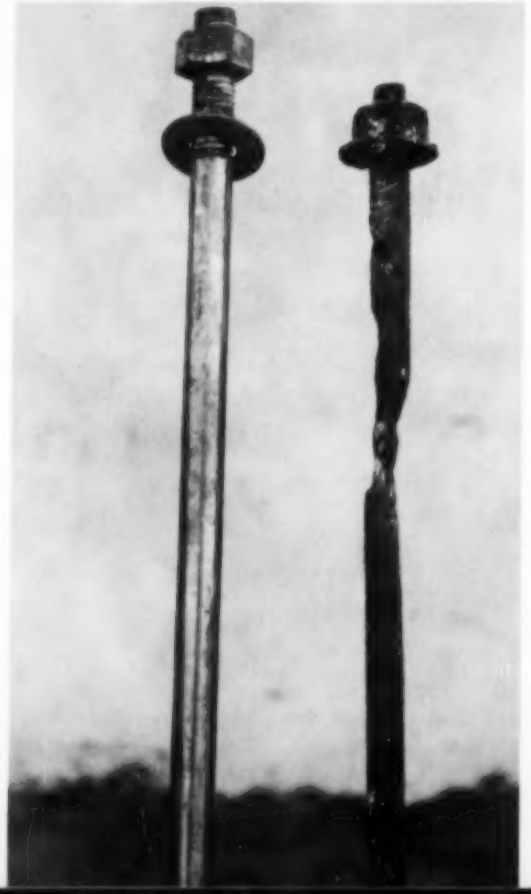
FOR HIGH TEMPERATURE STRENGTH. This looks like a sieve, but actually it is a Stainless Steel plate punched with 25,400 holes, and it makes up the end plate of a chemical plant heat exchanger. After the tubes were inserted the exchanger was placed in high-temperature, intensely corrosive 24-hour service. It was made by the Nooter Corporation, St. Louis.

NOTHING *can equal* *Stainless Steel*

for its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

FOR CORROSION RESISTANCE. Rare Earths, Inc., produces such valuables as cerium, lanthanum and praseodymium by means of an elaborate chemical separation process. In the filter press, corrosion destroyed carbon steel plate rods in six months. Stainless Steel rods were installed over six *years* ago, and are still in fine condition.



FOR TAKING A BEATING. These are 8th grade students from Dormont, Pa., public schools in a domestic science class. The sink tops were made by Pride Mfg. Co., Pittsburgh, from USS Stainless Steel. Says Pride, "These Stainless sink tops are ideal for school use. We've seen some 20-year-old sinks that still look as good as new."

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL

"I think forging is an art"

After about three days of heating, crane takes hot ingot to press.

Preliminary forging.
Basic shape of forging is determined here.

Secondary forging.
This is water wheel shaft for hydro-electric plant.

says **William C. Steele**

U. S. Steel Superintendent of Forging and Heat Treating

Forging an ingot is somewhat like sculpturing a statue by means of semaphore signals that you give to a lurching robot. Using only hand instructions, the forge shop pressman must blend the action of giant cranes, manipulator machines and the press itself. Working only with the immense, blunt dies of the press, he must knead the steel to develop its maximum strength, then squeeze it into the most intricate shapes, frequently to a quarter-inch tolerance.

Truly, this is an Art.

At our Homestead Forgings Division, William Steele has complete charge of the production floor where USS Quality Forgings are forged and heat treated. He has worked in the Division for 28 consecutive years, producing such things as special armor plate, compound-curved wind tunnel parts, hollow sleeves, precision rolls and machinery parts so complicated that you'd never believe they could be forged from a monstrous ingot of solid steel.

If there is any secret to USS Quality Forgings, it lies in our combination of superior steel quality, the finest processing equipment, and most important: skillful, completely reliable men like William Steele.

Please address inquiries or requests for our free 32-page booklet on USS Quality Forgings to United States Steel, Room 5419, 525 William Penn Place, Pittsburgh 30, Pa.

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- Heavy machinery parts—carbon, alloy, stainless
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- Electrical and water wheel shafts
- Specialty forging of all types

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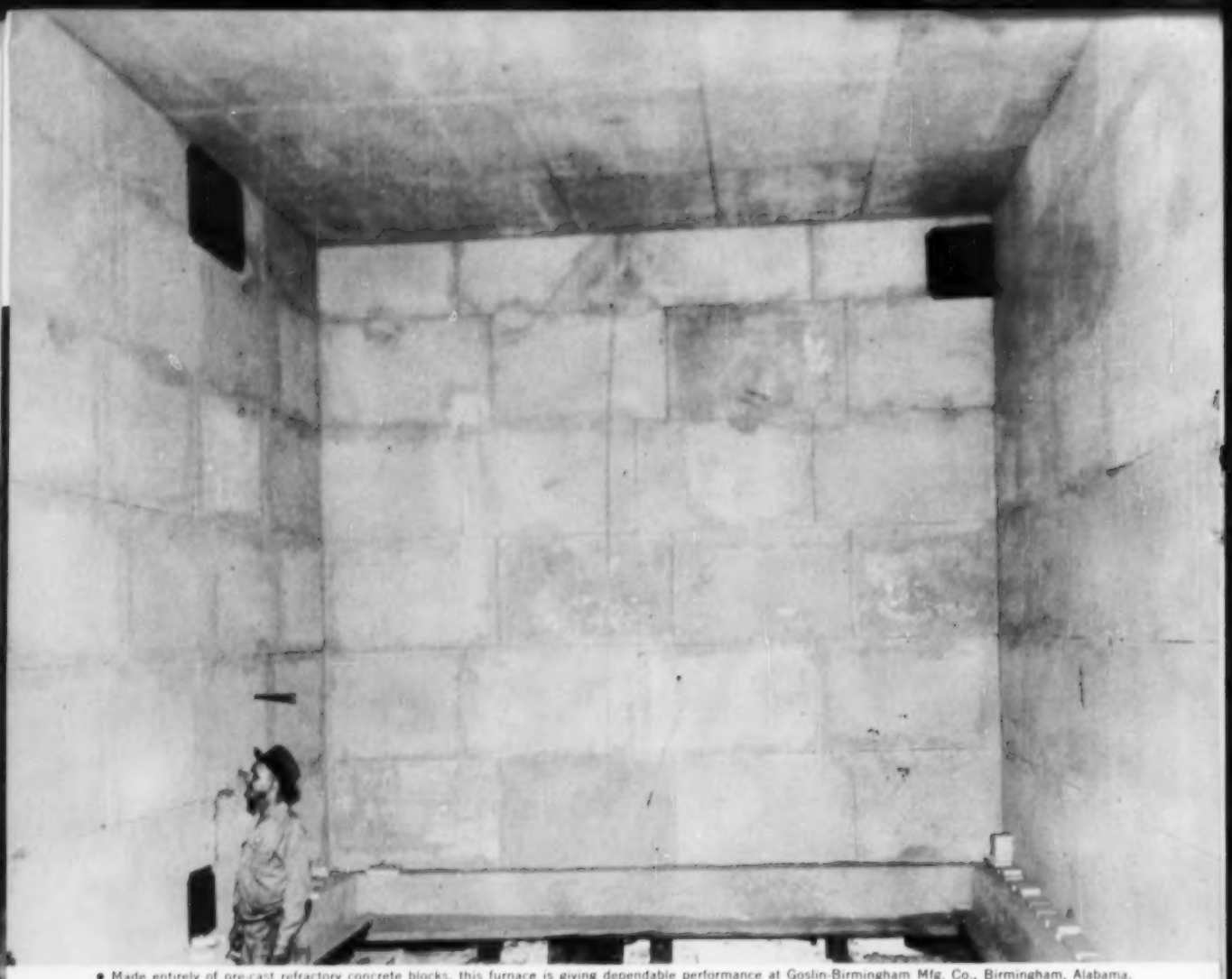
Final inspection. Piece has been heat treated, machined and subjected to dozens of critical tests. Now, it's a USS Quality Forging.



• Made entirely of pre-cast refractory concrete blocks, this furnace is giving dependable performance at Goslin-Birmingham Mfg. Co., Birmingham, Alabama.

Pre-cast blocks of Lumnite*-made concrete give excellent service in big furnaces

• Lumnite can take it. These big castings ride on car top made with Lumnite refractory concrete.

"This furnace was built for stress-relieving gray iron castings, and steel weldments. We encountered no difficulty in casting or erecting pre-cast blocks, of which entire furnace was constructed. It has operated with minimum trouble and is very satisfactory," reports Mr. A. W. Varnon, Plant Superintendent of Goslin-Birmingham Mfg. Co.

Furnace linings made with pre-cast refractory concrete blocks, or cast monolithically, can save time and money in your plant, too. Construction is fast and easy, with Lumnite calcium-aluminate cement, or Lumnite-base castables. Just pour refractory concrete in simple wooden forms. Lumnite reaches service strength within 24 hours.

Keep a supply of Lumnite cement or Lumnite-base castables on hand for other time- and labor-saving uses around your plant. You can make refractory concrete *designed for your specific job* by just adding water to a factory-prepared castable mix. Castables are made and distributed by leading manufacturers of refractories.

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*"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company

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MORE iron—Cast-iron frame and external parts assure rigidity and resistance to corrosion.

MORE copper — Allis-Chalmers greater use of copper increases electrical life.

MORE lubrication provisions — Large grease reservoirs surround bearings. Provision made for in-service relubrication — important where moisture or corrosive vapors contaminate grease.

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ALLIS-CHALMERS

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draw press "package"...

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• simplified maintenance...
• smooth, safe drawing...
• more productive strokes per minute

Thirty years the leader in the mechanical press field, Hamilton now gives you this latest product of dynamic press know-how. An all-new line of 500 to 4000 ton mechanical draw presses engineered for fast, safe drawing operation . . . with each press designed as a "package unit" for quick installation, simplified maintenance.

• *Package design* keeps all piping and wiring within the rugged, welded steel press structure. Installation is quick and easy . . . there's small chance of damage while installing. Once in place, the press unit can be put in operation simply by connecting piping and wiring to plant power services.

• *Hamilton's Exclusive Double-Lube system* provides both pressure and gravity flow lubrication to all bearings. Breakdowns from lubrication failure are virtually eliminated.

• *Operating mechanism in the press bed* simplifies inspection and maintenance . . . out of the way of production.

• *Variable cycle sequences* insure more productive strokes per minute. The press may have a fast advance and return, yet maintain a safe drawing speed.

• *Swivel arrangement of counterbalance cylinders* insures proper alignment when gibs are adjusted.

• *Safety die blocks and die lights* add effective operating safeguards.

You'll speed *your* production while you slash installation and operating costs . . . when you put these new Hamilton underdrive presses in your shop. They're designed and built to handle your toughest jobs better, faster—with far less downtime. Get the full story today! Write for complete specifications to Department 4546, Hamilton Division, BLH Corporation, Hamilton, Ohio.

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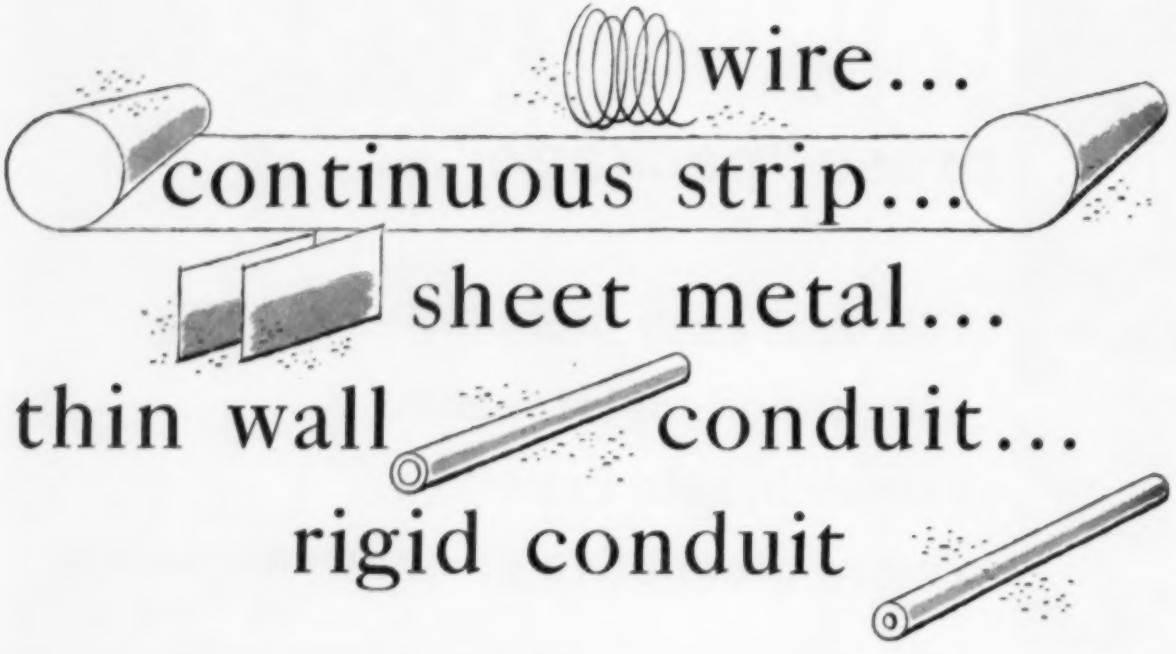

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This fine bench has a heavy-gage stainless steel top, fitted with chrome fixtures for vacuum, air and electricity. Flush-front drawers with stainless steel pulls glide smoothly on roller bearings. There is ample storage space with sliding doors and adjustable shelves in the enclosed cabinet base. Finish is baked-on charcoal gray enamel over a phosphate undercoat. You can have benches like this one in *your* laboratory or shop—designed and built to meet your specific requirements, and delivered promptly. Write us about your bench problem today. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

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HALLOWELL SHOP EQUIPMENT DIVISION

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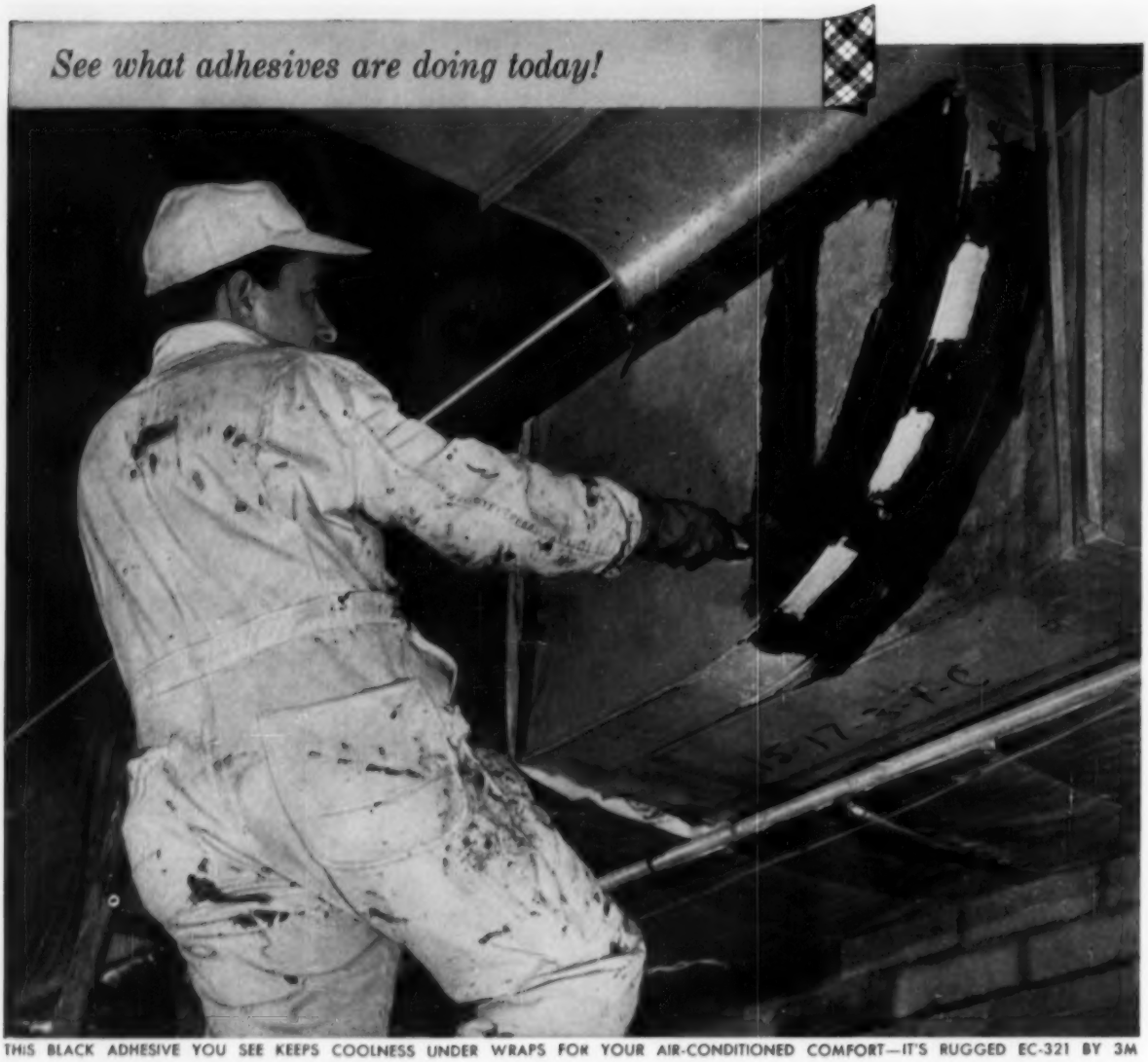

THIS BLACK ADHESIVE YOU SEE KEEPS COOLNESS UNDER WRAPS FOR YOUR AIR-CONDITIONED COMFORT—IT'S RUGGED EC-321 BY 3M

Holding a grip on sweating metal

You can feel the cold metal "sweating" as moisture condenses on it. Yet, to provide air-conditioning efficiency, you must apply insulation to the surface of this duct. And you have to do it despite condensation.

EC-321 holds insulation tight regardless of that moisture. The architect here specified this 3M adhesive after he saw a competitive adhesive fail. It was literally "sweated" loose.

EC-321 brushes easily, grips at once and allows enough working time. Where the fibrous glass must be drawn up between ducts, EC-321 doesn't bind or tear. It's nonflammable, fastens liner to duct interiors, bonds insulation to hot-air ducts, too.

Hundreds of 3M adhesives serve many varied metalworking industries, all the way from factory to installation.

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CALENDAR
OF MEETINGS

Aug. 21-24, Western Electronic Show and Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: Wescon, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, American Society of Mechanical Engineers: Fall meeting, Cosmopolitan hotel, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum. Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute. Packaging machinery and material exposition. Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 12-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

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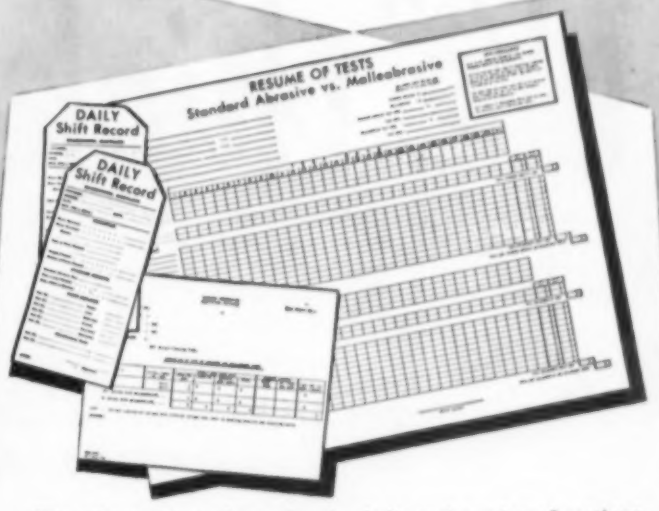
– PUT THE "test" IN testing!



The only real test of any abrasive is its cost per ton of castings —obtained only by completely recorded use in production.

Malleabrasive was the first metal abrasive to be sold on the basis of recorded production performance in user's plants. The fact is, in its early stages of limited production, we sold it only to those who would agree to run recorded comparative tests. Yes, Malleabrasive really "put the test in testing" — really started all of this testing business!

Malleabrasive's economy has since been proven in hundreds of plants, so there are no restrictions on its sale any more. But— we do say, if extravagant claims and gimmick-guarantees are offered you that some other abrasives are cheaper for you than Malleabrasive, the only way to get the facts is to run recorded tests of both materials. Don't depend on generalities.

Samples of the test record forms used to establish Malleabrasive's economy will be sent on request. Write us.

THE GLOBE
STEEL ABRASIVE COMPANY
MANSFIELD, OHIO

Sold and recommended by
Pangborn Corp., Hagerstown, Md.

"NOW IN EASY TO HANDLE
50-POUND DOUBLE BURLAP BAGS"

This CINCINNATI...

1½" thick x 12'

This 15012 Series Cincinnati All-Steel Shear has a 36" gap and a 48" back gauge range.

Power for heavy cutting with accuracy and operating convenience are combined in this machine.

Modern features such as—Hydraulic Holddowns, Front Operated Power Back Gauge, Hinged Back Gauge Angle, Automatic Pressure Lubrication, All-Steel Interlocked Construction, Forged Alloy Steel Eccentric Shaft—all contribute to an outstanding performance with low maintenance and high accuracy.

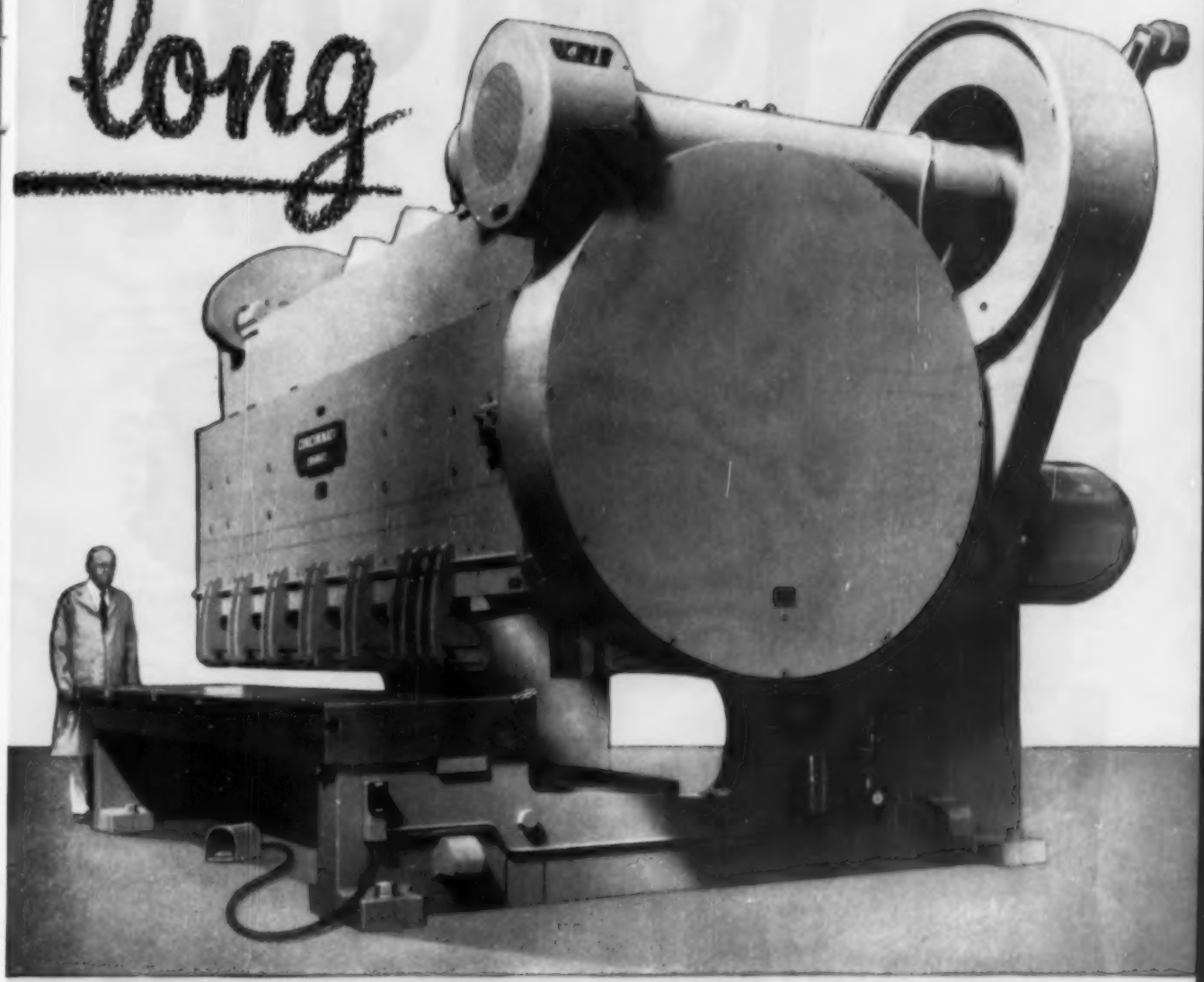
Write for Catalog S-7.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

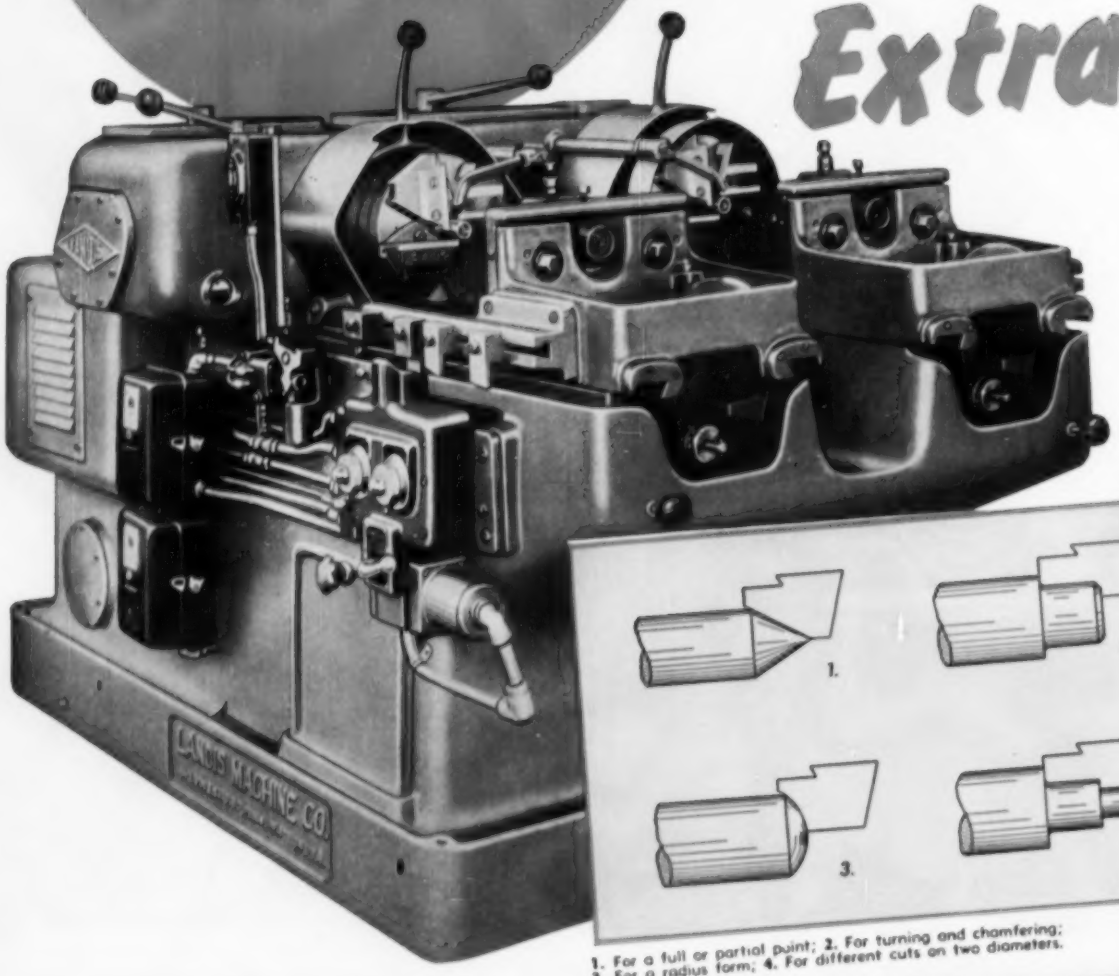
shears steel plate

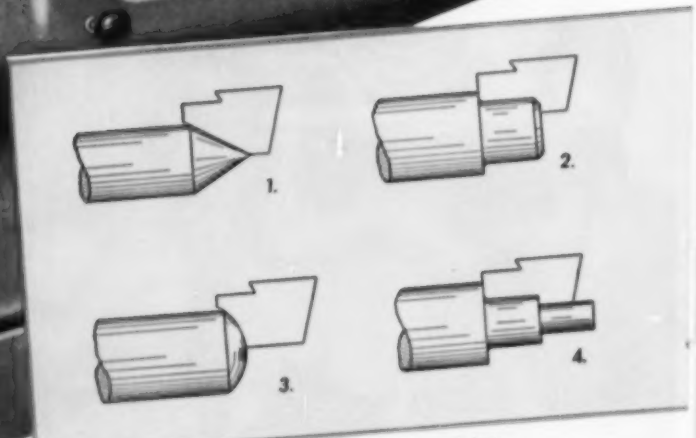
long



See your Cincinnati Representative for either Heavy or Light Shearing Applications.

Hollow Extra





1. For a full or partial point; 2. For turning and chamfering; 3. For a radius form; 4. For different cuts on two diameters.

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF THREAD GENERATING EQUIPMENT

Milling

LANDIS Feature

LANDIS Die Heads, in addition to conventional threading operations, can be equipped with LANDIS Turning Cutters which will perform turning, grooving, forming, and facing by the hollow milling method. Milling operations may be performed by LANDIS Heads applied to automatic screw machines, turret lathes, or LANDIS leadscrew-type or hydraulic-feed threading machines, and other positive-feed-type machines.

Many Production Advantages

Hollow milling by this method offers an increased efficiency occasioned by the application of a multiple number of cutting tools. The feed rate is thus approximately equal to that of a single tool, multiplied by the number of simultaneously-functioning cutters in the unit—four or six for LANDIS Heads.

The LANDMACO Double Head Leadscrew Threading Machine affords a particularly efficient hollow milling method. One carriage will perform the milling operation while the other carriage is being loaded by the operator, thus allowing consistent continuous production. In addition it is entirely practical to perform milling operations on one spindle and conventional threading operations on the other.

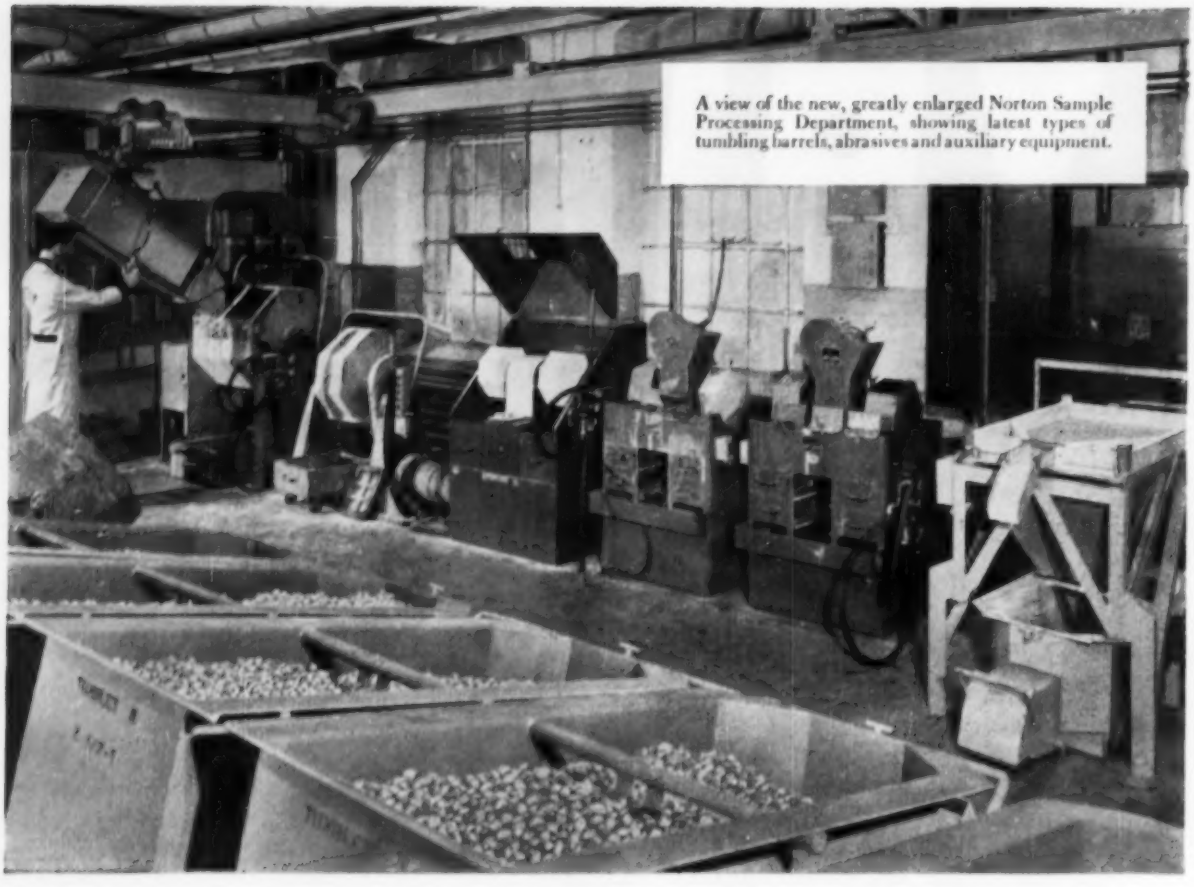
LANDIS Turning Cutters

LANDIS Cutters are economical tools for they are usable for most of their original length. Only the rake angle needs regrinding—a quick and simple procedure. One set of cutters will machine a wide diametrical range of work, and cutting speeds will range from 30 to 70 linear feet per minute

Wear and breakage of tools and spoiled work is held to a minimum. The cutting edges of the cutters can be precisely and uniformly located with relation to the center line of the work since they are diametrically-opposed in the cutting position. Thus with cutting strains evenly distributed, the workpiece is never forced out of alignment.

A variety of cutters can be used in LANDIS Die Heads—see illustration for several examples. Additional information will be supplied on request —please include specifications.

LANDIS Machine COMPANY
WAYNESBORO PA., U.S.A.



A view of the new, greatly enlarged Norton Sample Processing Department, showing latest types of tumbling barrels, abrasives and auxiliary equipment.

Find out what barrel-finishing can do for you

Make the Norton Sample Processing Department your proving ground for faster, lower cost production methods

If you're still finishing metal parts the long, hard, expensive way — with out-of-date tumbling or off-hand methods — here's your chance to find out how you can improve product quality and cut production time and costs.

The newly enlarged Norton Sample Processing Department puts at your disposal the very latest advances in barrel finishing — including equipment, abrasives and techniques.

Perhaps you'd like to speed up your deburring or descaling operations. You may have complicated parts. You may want to get a better color on your finish, or a lighter cut on die castings so as not to cut under the smooth outside surface.

Whatever your finishing problems, just send us sample parts — and they can range from tiny needles to hefty forgings. Without charge or obligation Norton production engineers will find out just what tumbling will do for you. Your finished parts will be returned along with a detailed report telling you exactly how to get best results from tumbling in your plant. This includes recommendations as to barrel type, size, speed and time cycles . . . type, size and amount of abrasive media to use . . . proportion of compound or cleaner to water, and other data.

What To Send Us

Along with your unfinished parts please forward: (a) a finished sample to be matched (hand-finished if necessary); plus (b) information on your present barrel finishing equipment, if any, including type and size of barrel and speeds. Address the Sales Engineering Department, Abrasive Division, NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

G-300

NORTON ABRASIVES

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NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

A Report from the

STEEL CENTER of Mid-America

SINCE
GRANITE CITY STEEL
1878

BY WATER, BY SHORT-HAUL TRUCK AND RAIL, SHEET STEEL MOVES TO MID-AMERICA FROM ITS OWN CONVENIENT SUPPLIER . . . AND FINISHED PRODUCTS MOVE OUT TO U.S. AND WORLD!

John Marshall, Chairman of the Board and Chief Executive Officer, tells why Granite City Steel plans third major expansion in past seven years.

"They say a great ballplayer is born with the knack of being 'in the right place at the right time' . . . then knows what to do about it.

"That's where we, as a company, find ourselves right now.

"We are the major basic producer of sheet steel ideally located to serve Mid-America . . . at a time when that great bank of states up and down the length of the Mississippi is rapidly developing industrially — building new plants; producing more appliances, automotive parts, building materials, containers, electric motors, farm equipment, highway materials, piping, weapons for defense . . .

"That is why—after two major expansions which have doubled our ingot capacity and given us one of the most complete and modern sheet steel operations in the country—we are now preparing to increase production another 30 percent.

"From the standpoints of location, transportation, service, we are Mid-America's natural steel center . . . and the industrial future of Mid-America looks good to us."

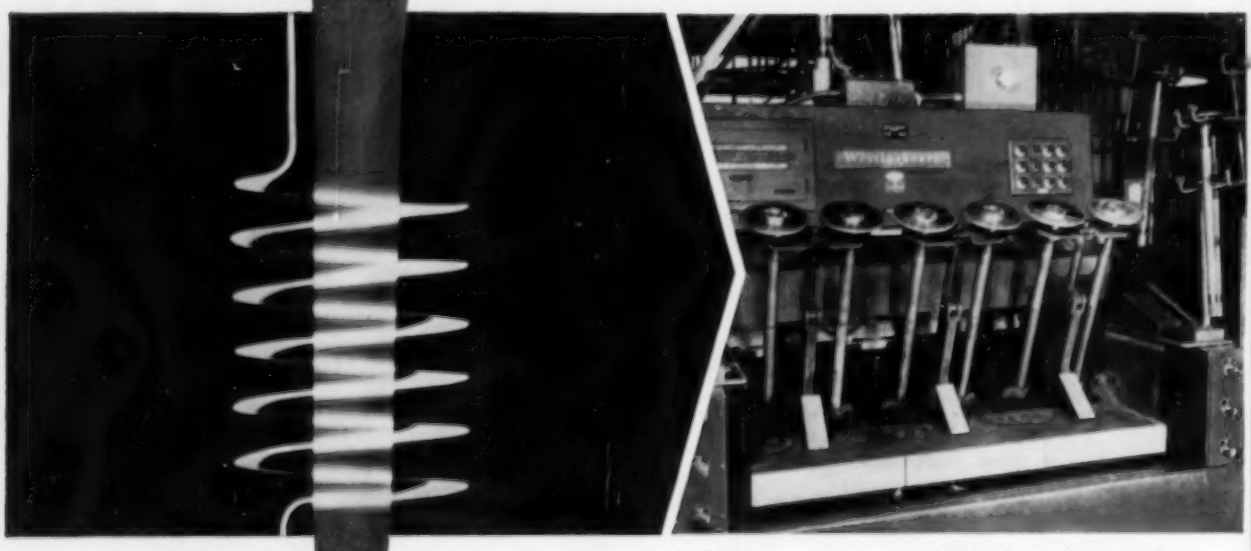
NEW COLOR MOVIE AVAILABLE!

"Steelmakers to Middle America"—takes you through the Granite City Steel plant, shows you how steel is made—now available for FREE group showings. For bookings, write: Public Relations Dept., S-62, Granite City Steel Co., Granite City, Ill.

GRANITE CITY STEEL

And subsidiary: Granco Steel Products Co.

Westinghouse induction heating doubles axle



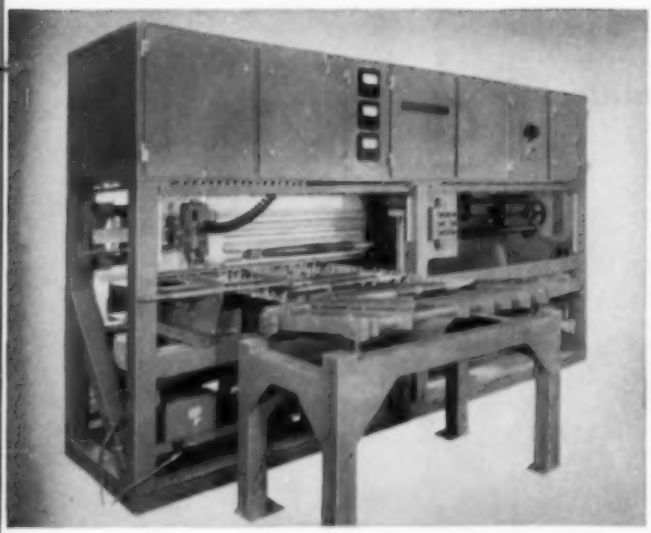
1. A single operator surface-hardens 6 rear-axle shafts at each setup of this Westinghouse induction unit. Production per hour totals 210 shafts.

R. E. Cheek
Manager, Induction Heating Department

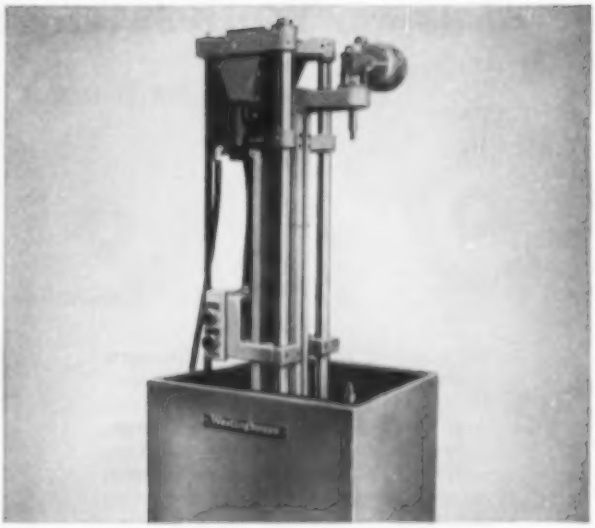
"Three different axle-hardening applications," reports R. E. Cheek, "show a slice of Westinghouse experience in solving production line heat-treating problems. Dependability of Westinghouse induction equipment, for example, protects production timing and holds maintenance to a minimum. Results are measured, too, in three important profit advantages."

1. Twice the axle fatigue life is obtained from lower cost, plain carbon steels. No more need for costlier alloys.
2. Lower carbon steels lengthen tool life . . . reduce machining and replacement costs.
3. Axle shaft distortion is minimized by rapid induction heating and quenching.

fatigue strength . . . lowers cost



2. As many as 33 axle shafts up to 42 inches long and weighing up to 100 lbs. are surface-hardened by this Westinghouse induction equipment.



3. Westinghouse general-purpose induction scanner handles shafts up to 30 inches long, 80 lbs. weight, for surface-hardening and quenching.

Many other factors, such as savings in floor space, rapid start-up, and cooler more productive working conditions add to the high efficiency of each installation.

A profit return for you? Westinghouse induction-heating experience can show you production problems turned into profitable solutions for hardening, annealing, joining, or forging. Why not call on your local Westinghouse industrial heating sales engineer? He'll bring you expert problem solving and complete service. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Penna. J-10455

The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

Time Tested

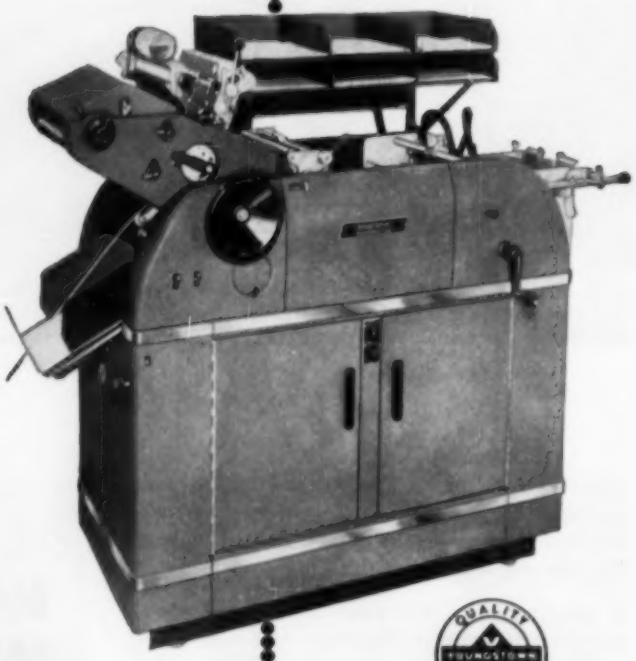
ADDRESSOGRAPH-MULTIGRAPH BUSINESS MACHINES

are created with quality in mind

... that's why **YOUNGSTOWN STEEL**

is specified as a basic material

Multigraph **Multilith Offset** Duplicator, one of many production machines for business records manufactured by Addressograph-Multigraph Corporation, Cleveland, Ohio.



It's apparent in many quality products you see every day: Perfection of manufacture starts with the basic material. And, with Addressograph-Multigraph, as with many other quality manufacturers, a basic material is Youngstown Steel—cold finished bars and cold rolled sheets.

Youngstown Cold Finished Bars have desirable uniformity and machineability. Injurious seams, cracks and other imperfections do not occur. Youngstown Cold Rolled Sheets have the right temper that makes them easier to form. That means fewer rejects and better fabricated products.

You are hours, dollars and energy ahead when you specify Youngstown. Get in touch with our nearest Youngstown District Sales Office for complete information.

QUALITY YOUNGSTOWN SERVICE

Youngstown COLD FINISHED BARS COLD ROLLED SHEETS

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

it's the Coolest...
and PRODUCTION METHODS at York are real cool too, man!
No matter how you say it, the facts are easy to understand—York assembles the entire chassis and wrapper for three different size air conditioner units with unusual efficiency and at minimum cost. And they do it all with Sciaky resistance welding techniques — developed to put profits back into manufacturing!
That enviable combination of good design and low cost is giving York's cool comfort to more summer-bound families than ever before. Not even the toughest assembling operations can disturb your sleep this summer if you take advantage of Sciaky resistance welding techniques—just like York does!
York
SCIAKY
Largest Manufacturers of Resistance Welding Machines in the World
Dick Carlton
Turn the page and see how York's doing it.....

The Sciaky technique of resistance welding used by the York Corporation, York, Pennsylvania.

Complex air conditioner chassis assembly costs cut 34.5%... Multi-part wrapper assembly costs cut 60.9%

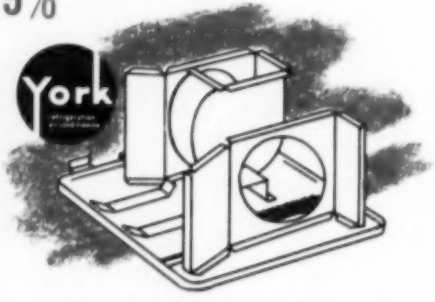
Sciaky Resistance Welding Techniques simplify operations, increase production, and facilitate model change-over at York Corporation

Integrated, standard Sciaky welders and a simple multiple gun welder assemble the entire chassis and wrapper for the one-half, three-quarter, and one ton size York air conditioners.

This Sciaky technique of fabrication, producing 90 assemblies per hour, permits tremendous production increase *without* basic equipment change. And seasonal model change-over is readily accomplished.

Put the Sciaky concept of resistance welding to work on your product ... your result—*more useful work* at *lowest operating cost* with *maximum reliability!*

Write for your free copy of "Resistance Welding At Work", Vol. 4 - #10 for all the details of the development and use of the Sciaky technique of assembly at York.



Sketch of completely assembled York Air Conditioner Chassis.

• • •

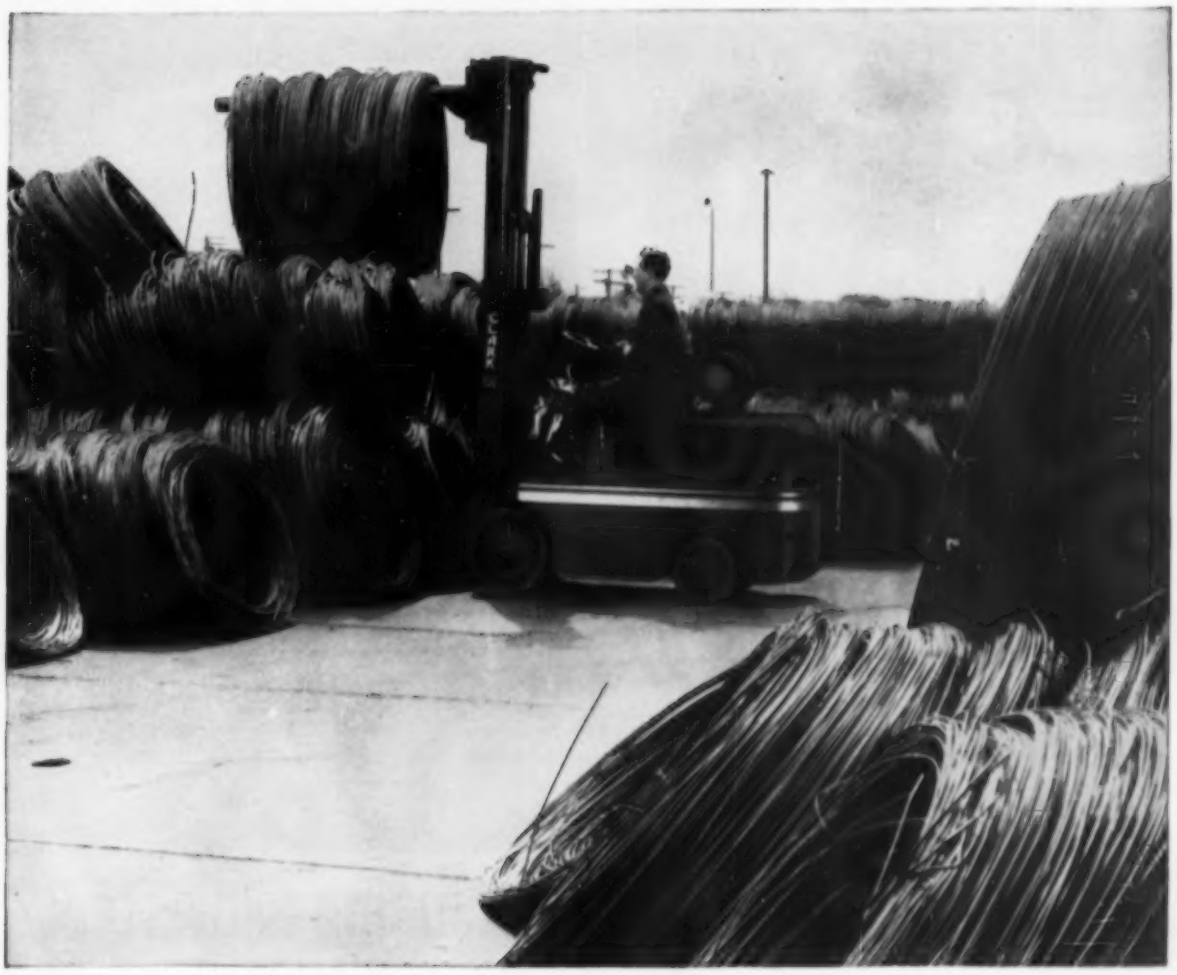
Write for Bulletins 338 and 339

The most significant development in the history of resistance welding ... the new Sciaky Predetermined Electronic Counter Weld Control.

Largest Manufacturers of Resistance Welding Machines in the World

SCIAKY

Sciaky Bros., Inc., 4916 West 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600



Moves tough-to-handle steel wire

—*by the ram full!*

Over a million pounds of raw steel wire received and processed each week by Wire Sales Company of Chicago is handled entirely by Clark LP-Gas trucks equipped with Clark's Ram attachment.

Constructed of heavy wall tubing, the Ram attachment is used extensively for handling coiled strip steel, coiled wire and other material with openings through which it can be projected. The ram is available in several standard lengths.

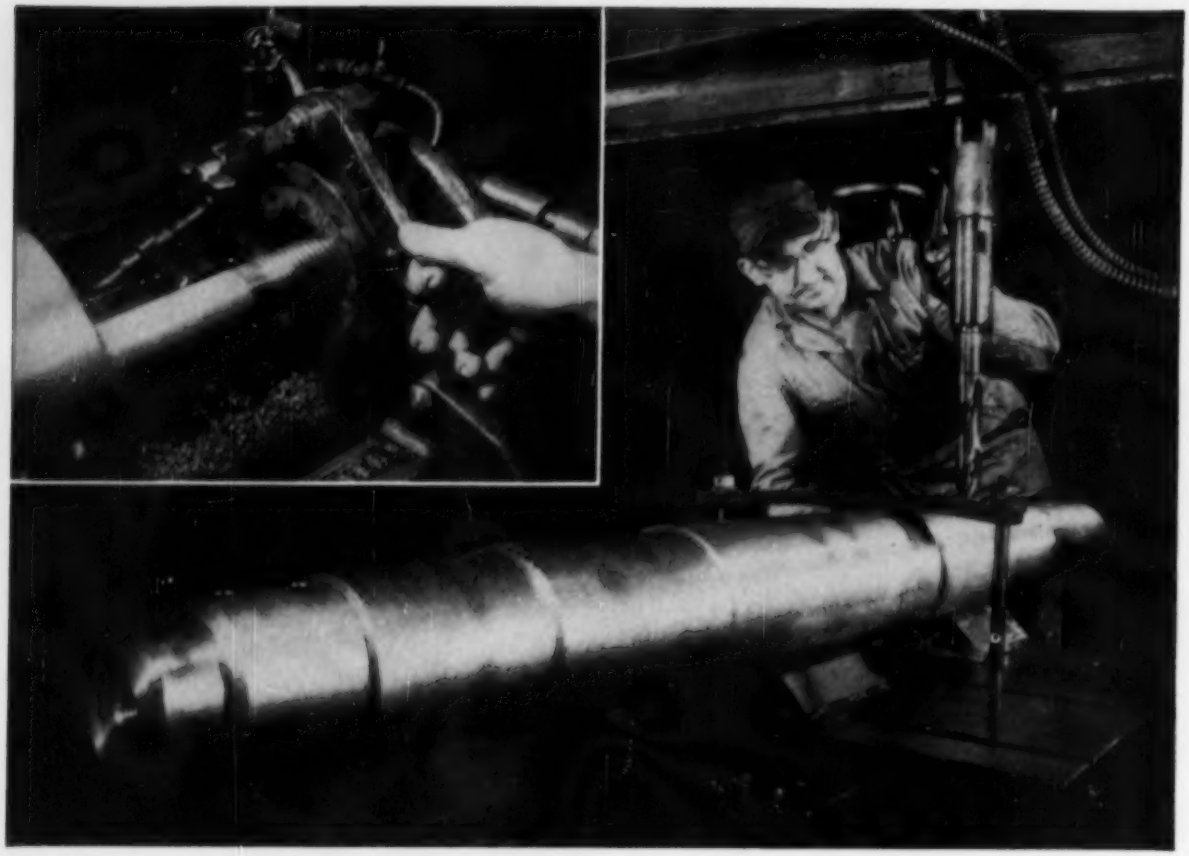
Add to the productivity of ram operation Clark's *factory installed* LP-Gas system, and you've got the workings of pure efficiency. Fueling is safe and fast (only 2 minutes to change tanks) maintenance and engine wear is greatly reduced. Wire Sales Company, for example, estimates an average annual saving of $8,400.00 in reduced fueling time and lower maintenance.

Why not investigate the advantages of a U-L Approved, Clark *factory installed* LP-Gas system for your own operations. While at it, check the wide variety of special attachments available to handle practically any job. Your local Clark dealer will be happy to help—he's listed in the Yellow Pages under "Trucks, Industrial."

A BETTER BUY WITH LOCAL SUPPLY—*Genuine Clark Parts*

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 26, Michigan



Need extra-strong, free-machining alloy steel?

Call us for FC ALLOY STEEL

Like most mining concerns, Putman and Greene, Inc., Philipsburg, Pa., uses a good bit of steel to repair and maintain their fleet of off-the-road haulers and earth-moving equipment. Listen to what Mr. Russel Lucas, Shop Superintendent for the company, says about FC Alloy Steel: "FC machines so well and has such superior strength that we use it exclusively for the turning of pins, bolts, shafts and axles."

Here are some facts about FC Alloy Steel:

It gives about 3 times the tool life of comparable machining steels.

It is delivered heat-treated to 255 to 302 Brinell hardness.

It has from 125,000 to 140,000 psi tensile strength.

U. S. Steel Supply can sell you FC Alloy Steel Bars in any size or length you need. You get fast delivery, too.

Call your U. S. Steel Supply salesman today.

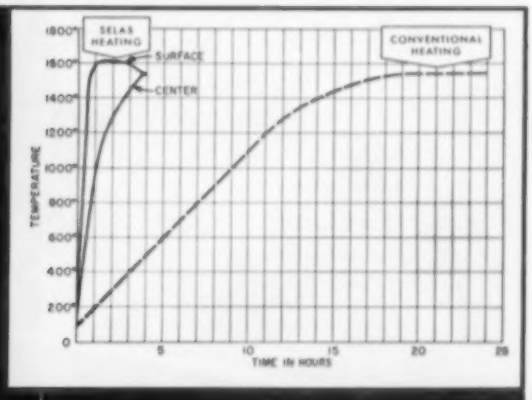
U. S. STEEL SUPPLY

DIVISION

General Offices: **208 So. La Salle St., Chicago 4, Ill.** **Warehouses and Sales Offices Coast to Coast**

UNITED STATES STEEL

FAST HEATING of LARGE STEEL SECTIONS is *practical* and *safe* with Selas Gradiation®



FAST heating is playing an increasingly important part in helping modern industry keep pace with today's high production requirements and exacting demands. In addition to the obvious increases in output, ***FAST*** heating opens the way to automatic, continuous processing of large steel sections.

FAST: At the Heppenstall Company, Pittsburgh, for example, alloy steel die blocks, 8" to 24" thick, are heated to 1550°F, for hardening, *five times faster* by Selas Gradiation than by conventional methods.

SAFE: Sonic testing of every Selas ***FAST***-heated die block proves its flawless quality, reproducible uniformity.

PRACTICAL: The completely automatic program control heating accomplished in the Selas gas-fired furnace proves ***FAST*** heating is a practical tool for modern steelmakers.

Consider these additional Selas advantages: Precision timing of the heating cycle permits close scheduling of other facilities and manpower. Less labor and lower labor skills are required. Fuel savings of 20%. Quick, economical start-up.

The above furnace was prefabricated by Selas and installed intact in the Heppenstall plant with little or no production interference.

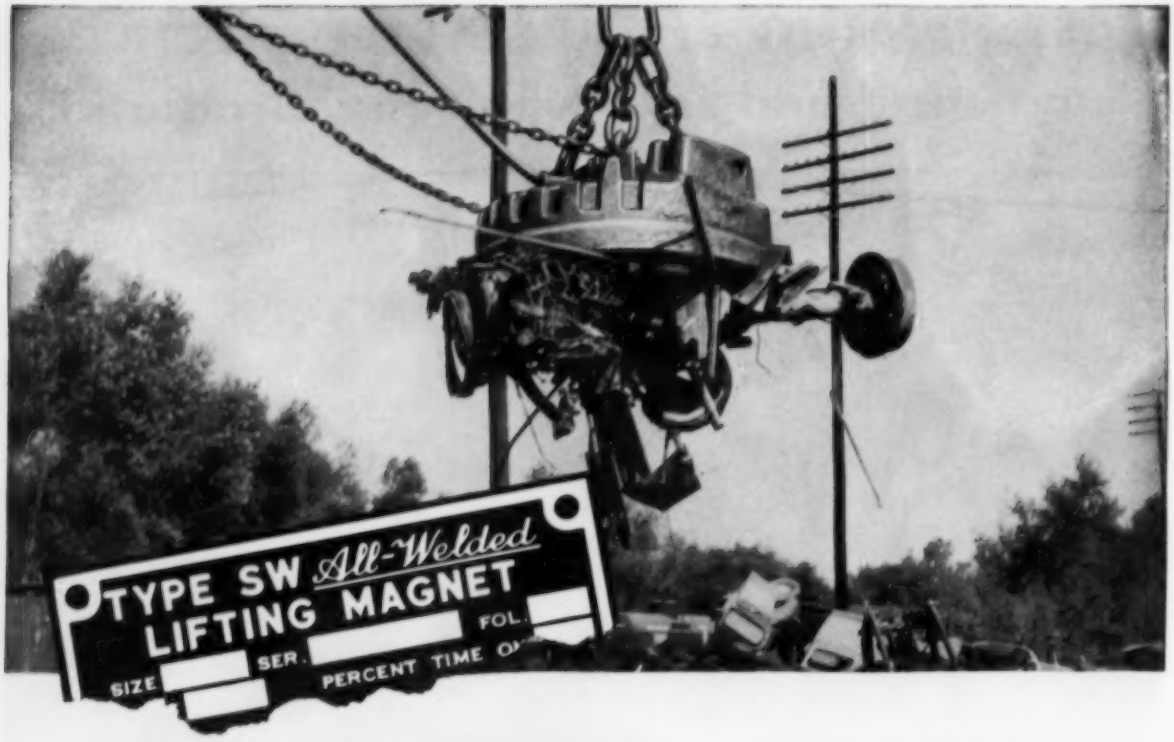
In another installation, Selas Gradiation ***FAST*** Heating handles steel sections up to 10' x 24' x 3.3' . . . weighing 192 tons . . . *five times faster* than by usual practices.

Write Dept. 28 for descriptive data and more information about Selas Gradiation ***FAST*** *Heating*

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION



More Features of EC&M TYPE SW ALL-WELDED LIFTING MAGNETS Assure More Dollar Value

EC&M Type SW ALL-WELDED Lifting Magnets have a new look . . . inside as well as outside. Stronger, better designed to withstand the hard knocks encountered in magnet operation, they are easier to maneuver, and through high lifting capacity they reduce handling costs.

The magnet-coil is wound between turns with purer, thinner asbestos tape, with its strength increased by impregnation with EC&M No. 281 compound. Between layers, the insulation is a new product—ECAMICA board which is moisture-free, has high dielectric strength and excellent mechanical ability. A new fabricating process locks the windings against movement.

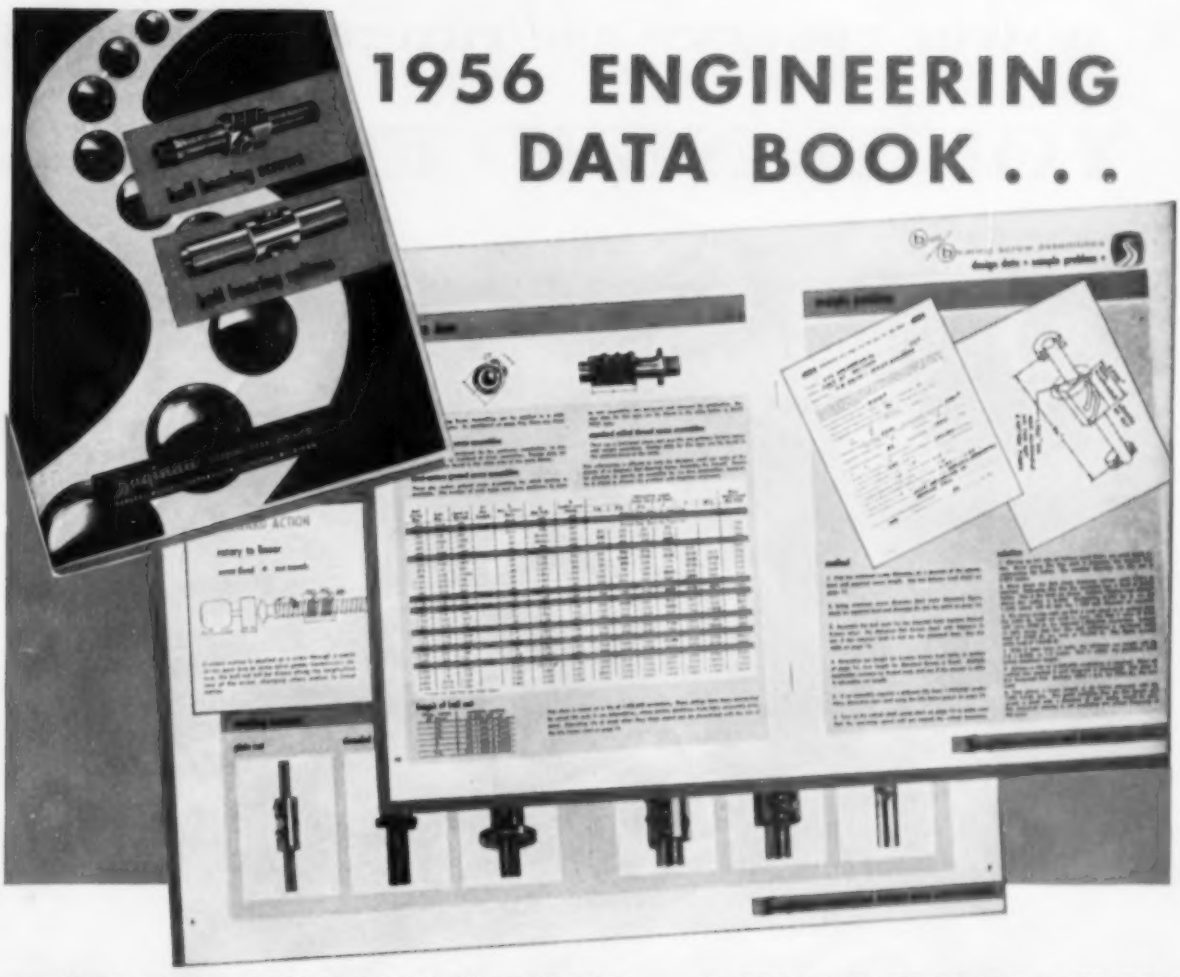
Look at the features pictured here in the top and bottom views of the magnet. Remember, too, that these EC&M magnets are ALL-WELDED to keep pole shoes tight—to keep moisture out—to increase the efficiency of the magnetic circuit and to prolong magnet life.

write for bulletin 900

SQUARE D COMPANY

EC & M DIVISION • CLEVELAND 28, OHIO

1956 ENGINEERING DATA BOOK . . .



SHOWS HOW SAGINAW b/b SCREWS and SPLINES FREE YOU FROM DESIGN LIMITATIONS OF ORDINARY ACTUATORS and POSITIONERS

BOOK CONTENTS: Principle • Types • Basic Operations • Coupling Methods • Efficiency • Versatility • Advantages • Selection Factors • Charts: Expected Life, Critical Speed, Column Load • Design Data • Sample Problem • Typical Custom Assemblies • Standard Assemblies

SAGINAW b/b SCREWS are *90%-98% efficient* (compared to 15%-20% efficiency of Acme screws). Require 2/3 LESS torque and power for same linear output—with consequent weight, space reductions. Function normally at −75° to +400° F. Two types: precision-ground or economical rolled-thread. Have been built 1½ in. to 39½ ft. long.

SAGINAW b/b SPLINES have *40 times lower coefficient of friction* than sliding splines; transmit or restrain high torque loads far better; permit vital power, weight, space reductions. Have been designed 3 in. to 9 ft. long.

Saginaw ball bearing Screws & Splines

SAGINAW STEERING GEAR DIV., GENERAL MOTORS CORP., SAGINAW, MICH.

SEND COUPON FOR 32-PAGE ENGINEERING DATA BOOK

Saginaw Steering Gear Division, General Motors Corporation
b/b Screw and Spline Operation
Dept. 6N, Saginaw, Michigan

Please send new engineering data book on Saginaw b/b Screws and Splines to:

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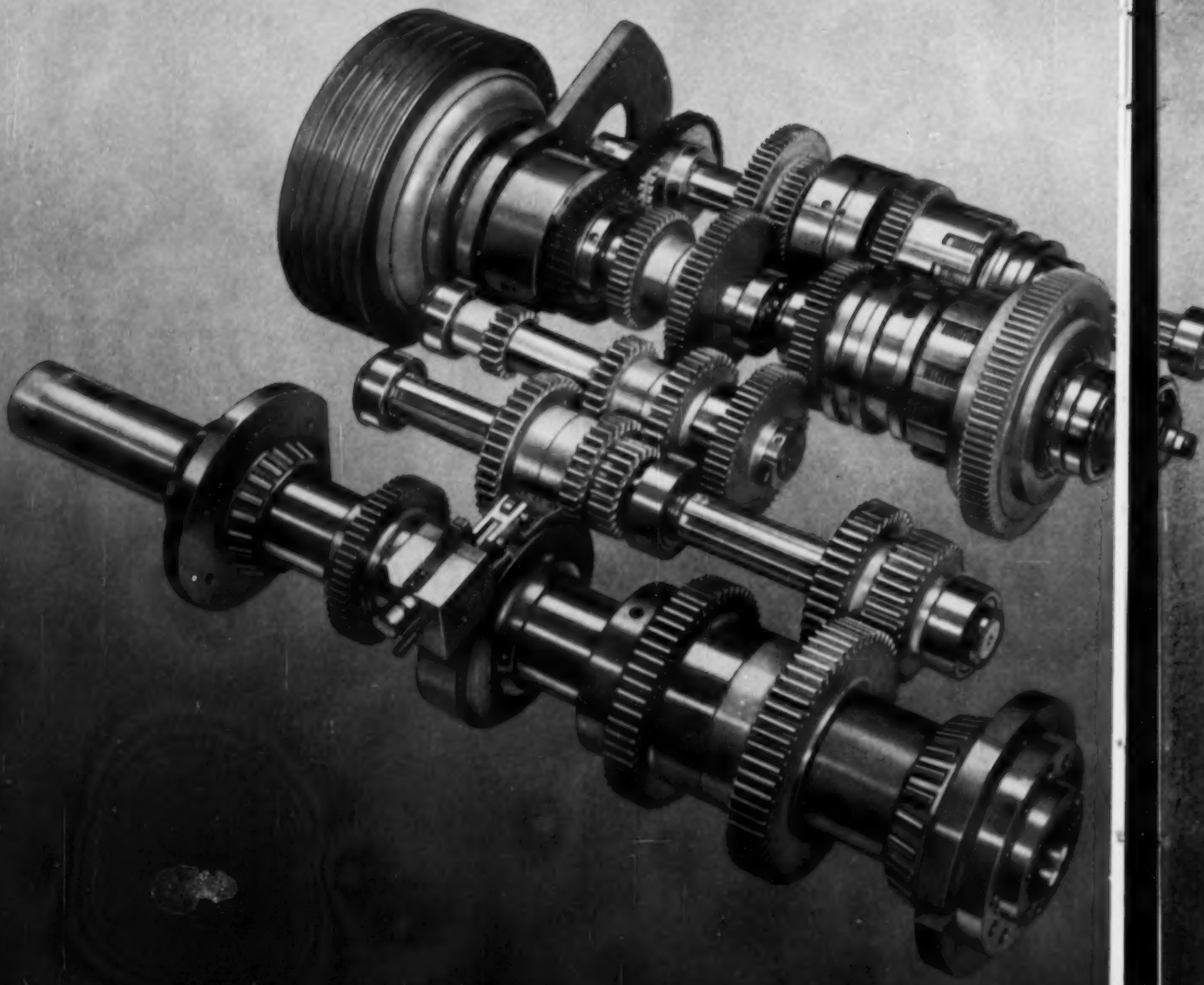
The **power reserve *and* range of speeds**

YOU'LL NEED FOR THE



TOOLS OF TOMORROW

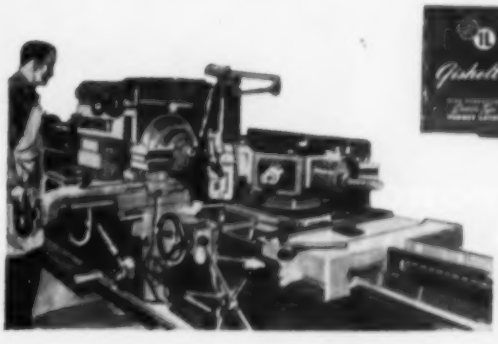
New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

GISHOLT MACHINE COMPANY

MASTERLINE GISHOLT SINCE 1887

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CHAMBERSBURG
STEAM DROP HAMMERS

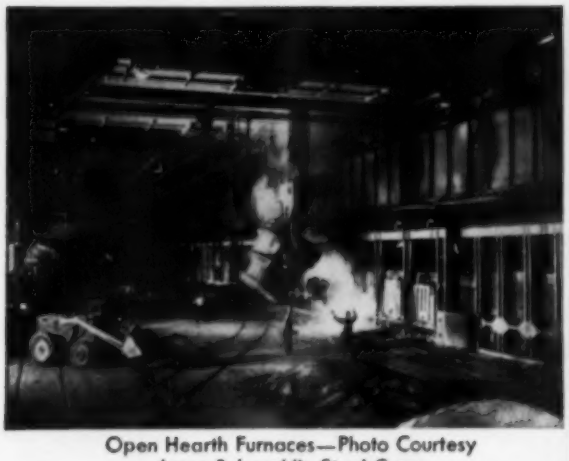
MODEL E

MODERN FORGING REQUIREMENTS DEMAND MODERN HAMMERS ·

Shown above is a 6000 lb. Model "E" Chambersburg Steam Drop Hammer forging 4" alloy steel valve bodies. A Chambersburg 200 ton Steel Side Trimming Press is used to complete the operation. The Chambersburg Model "E" Hammer pays its way through increased production and trouble-free service. Details of this modern hammer are in our Bulletin No. 55-L-4. If interested, write for a copy.

Trimming Forgings on Chambersburg Trimmer

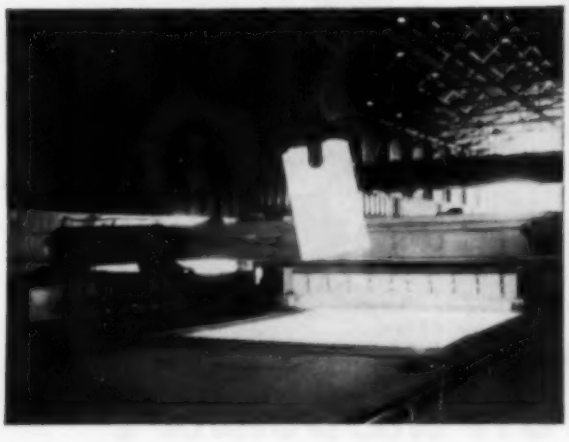
CHAMBERSBURG ENGINEERING COMPANY · CHAMBERSBURG, PA.



Open Hearth Furnaces—Photo Courtesy
Jones & Laughlin Steel Corp.

Continuous Heating Furnaces—
Photo Courtesy Crucible Steel Co.

Soaking Pit—Photo Courtesy
United States Steel Corp.



Heat Treating Furnace—
Photo Courtesy Taylor Forge & Pipe Works

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LOFTUS Industrial FURNACES

For years Loftus Industrial Furnaces have been providing dependable, economical service to the steel industry. Their long life and efficient performance have been proved by time. The fact that they materially contribute to lower-cost operation and increased production is a matter of record.

Whatever your heating or heat-treating requirements, it will pay you to take advantage of Loftus' long experience in furnace design and construction. Many of the world's leading companies have—and to their utmost satisfaction, as proved by the high percentage of repeat orders we get.

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Get "ELL" & "ESS" On the Double!

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Pretty expensive "saving" isn't it?
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Lamson & Sessions ("Ell" & "Ess", to you) have been called in on many a "foul up" and haven't failed yet to put their knowing fingers on the cause.
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IDEAS...*on making the most of wire cloth!*

● Unless you're in the business up to your ears, you'd hardly be aware of the infinite variations that can be offered today in industrial wire cloth. Not only variations in the wire, metal, weave and mesh, but also in finishes, coatings, roll lengths, widths and packaging. And the *Reynolds Wire Division* of National-Standard has carried this flexibility to a high point in the industry.

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And that is exactly why *Reynolds Wire Division* goes all out in furnishing technical and analytical service—service that benefits customer after customer, small or large. This exceptional service is available coast to coast . . . wherever you are.

Are you open to some ideas on making the most of wire cloth? Do you have any particular production problems in the use of wire cloth? Let's discuss your requirements.

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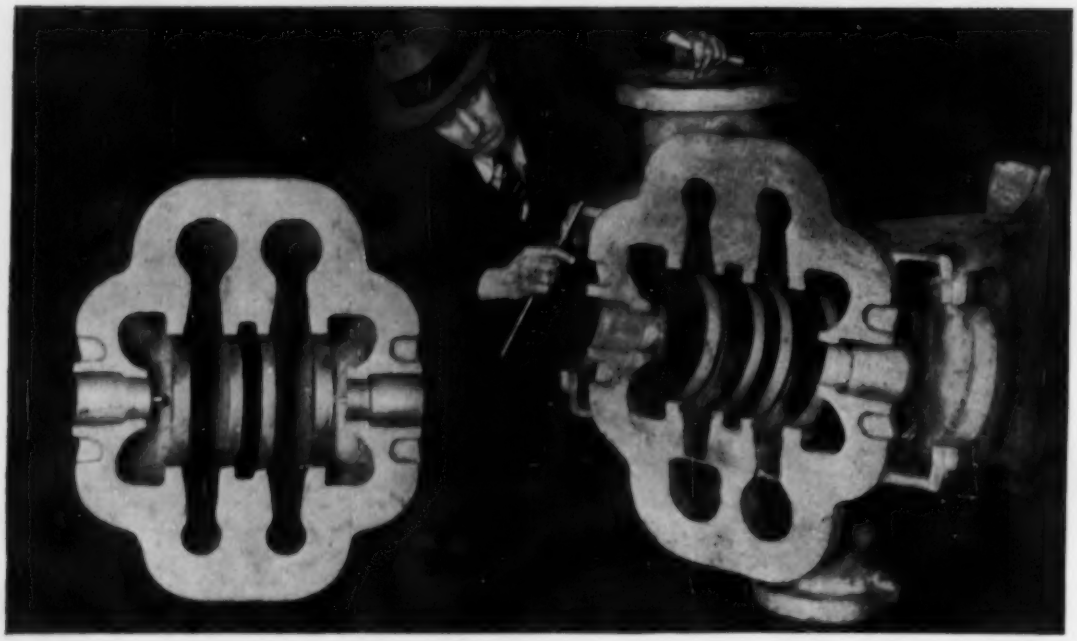
Round and Shaped Steel Wire, Small Sizes



There's NO problem in Stainless Castings that we can't answer for you—

Write for this book on AL STAINLESS STEEL CASTINGS

32 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. S-801

Odd shapes or intricate sections are certainly no problem—look at some of our stainless steel casting products illustrated above. We could show you hundreds more. And size is no consideration, either—we're equipped to handle any stainless castings—from a few ounces to thousands of pounds.

The really important point for you to consider is not the matter of shape or size, but of *experience.* The AL Buffalo Foundry is a group of specialists in high-alloy steel castings *exclusively* . . . pioneers in both the static and vertical-centrifugal methods of casting stainless steels.

For your assurance, there's a long record of years of successfully answering difficult service conditions with sound, clean-grained AL Stainless Steel castings—free from defects, easy to machine and dependable in supply. ● Let us quote on *your* stainless casting requirements. *Allegheny Ludlum Steel Corporation, Henry W. Oliver Building, Pittsburgh 22, Pennsylvania.*

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For Stainless Steel in ALL Forms—call

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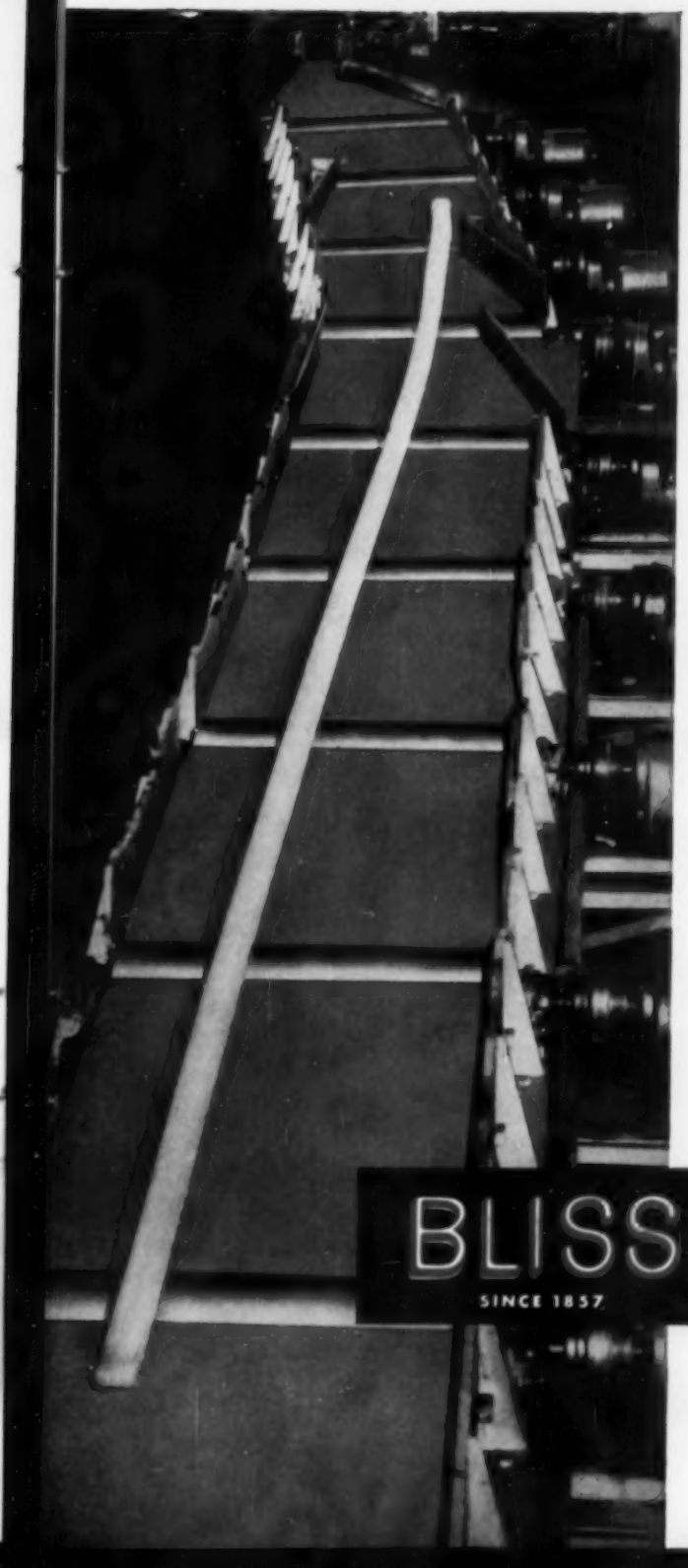
Warehouse stocks carried by all Ryerson Steel plants

AL STAINLESS STEEL

Special powered-roller tables speed handling at new Merchant Bar Mill



To meet growing demands for specialized bar products, Phoenix Manufacturing Company mechanized breakdown operations at its new bar mill with three specially-designed Bliss powered-roller tables:

- a "live" table speeds billets from furnace into a three-high roughing mill,
- a tilt table shoves them back into the roughing rolls during breakdown passes, and
- a runout table carries them into the first of six finishing mills.

Designed, built and installed by Bliss, these tables help Phoenix hit top production schedules at lower costs by cutting handling time to the bone. What's more, they're designed for fast, easy maintenance—to keep up a steady, shift-after-shift flow of bar stock.

These powered-roller tables, like all Bliss rolling mill accessory equipment, are built to your specific needs, installed under the supervision of Bliss field engineers and serviced by experienced engineering personnel. Why not get more information on Bliss rolling mills and accessory equipment? Write today for your copy of Catalog 40-A—Bliss' 60-page Rolling Mill Brochure.

Bliss-designed "live" table was installed during mill construction.

E. W. BLISS COMPANY, General Office: Canton, O.
ROLLING MILL DIVISION: SALEM, OHIO
Presses, ROLLING MILLS, Special Machinery

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... it's a guarantee

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a complete **AIRCOMATIC** "package" . . . from recommendation to results

Aircomatic welding is an inert-gas, shielded arc process using a a consumable wire electrode. The basic unit, manual or automatic, designed and manufactured by Airco, includes the welding head, carriage assembly for wire drive and control equipment, cables, hoses, and flexible wire casing.

The consumable wire electrode is produced to rigid Airco specifications as to purity, cast, and metallurgical content. Normally supplied on expendable spools, Aircomatic wire is available in aluminum, steel, stainless steel, nickel, titanium, copper, and copper base alloys.

Airco shielding gases include both helium and argon, produced by Airco, or mixtures thereof for particular requirements. Pure carbon dioxide gas is also available from Airco for use as a shielding medium where applicable.

Aircomatic is a direct-current welding process. A complete line of Airco motor-generator and rectifier type welders are designed for Aircomatic characteristics — the latest of which is a new constant potential 800 amp ACV welder.

The Aircomatic process was invented, designed, developed, and licensed by Airco. Airco's eight years of experience have given the metal working industry an inert-gas process that welds all kinds of metals — adding speed, economy and versatility to every suitable application.

An Airco Representative can give you a completely unbiased opinion as to how Aircomatic can best be employed — because — Airco is a leading manufacturer-supplier of all types of oxyacetylene, metallic arc and inert-gas shielded welding and flame cutting processes, their controls, supplies, and accessories.

Other Airco inert-gas welding processes include Aircospot and Heliwelding. Write today for details.

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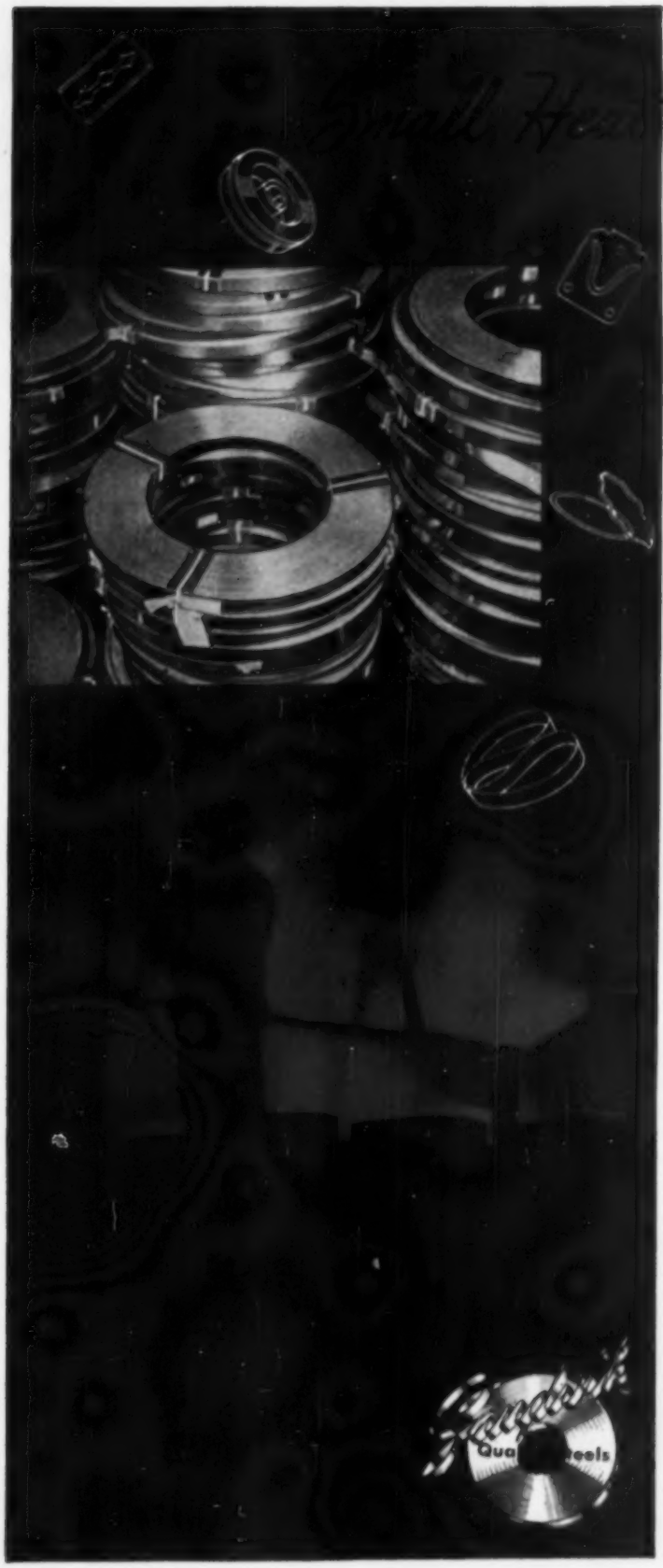
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols, and other synthetic resins.



Small Heat Production

is behind SANDVIK SPRING successful performance

Sandvik specialty steels are carefully produced in relatively small quantities which facilitate closer control and uniform results.

Pure Swedish ore and coniferous, sulphur-free fuel are used to produce pig iron of unusually high quality. Sandvik's small blast furnaces and steel furnaces afford closer control of the quality of each heat.

In the subsequent rolling and annealing operations, Sandvik applies its specialized experience, skill and equipment, — "tailoring" the steel to the precise gauge, hardness and surface finish required.

The final result is the inherent quality which has made Sandvik spring steel successful in so many exacting applications.

You can get Sandvik strip steels:

- **In special analyses for specific applications.**
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- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock — also slitting facilities available.**

Ask your nearest Sandvik office for further information or technical assistance.

Sandvik Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc. • Piston Ring Segment and Expanders • and many other applications.

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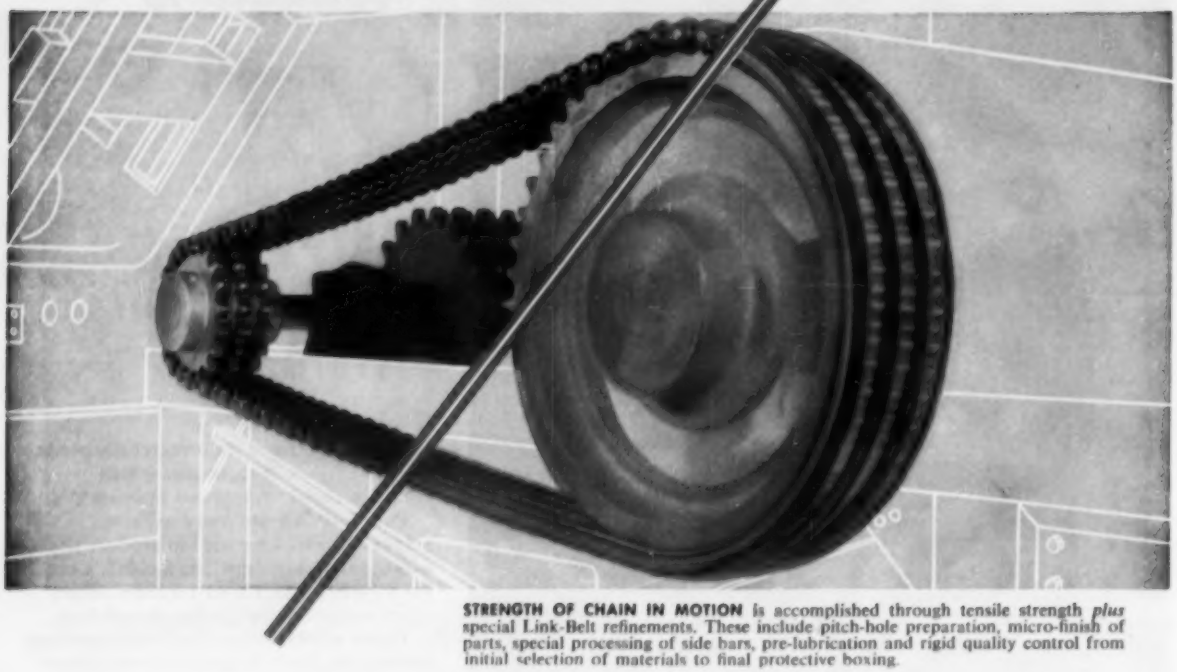
Not just static strength, but . . .

RESISTANCE TO TENSILE STRESS is achieved by use of properly heat-treated, accurately-machined side bars made of premium steel and fitted with properly-hardened pins, bushings and rollers. But to resist *operational* stresses, additional controls over dimensional accuracy, uniformity and roller resiliency are essential.



STRENGTH OF CHAIN IN MOTION is accomplished through tensile strength *plus* special Link-Belt refinements. These include pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication and rigid quality control from initial selection of materials to final protective boxing.

dynamic strength

assures longer work-life for LINK-BELT Roller Chain

IN addition to known tensile loads, roller chain in motion is frequently subject to other operating stresses. Engagement with sprockets . . . shock of starting loads . . . centrifugal loads—there are many similar stresses.

Link-Belt's solution: greater dynamic strength, achieved through design, manufacturing and processing "extras" . . . plus a combination of other important refinements. And you see the results in smoother, more efficient performance that lasts measurably beyond the life of ordinary roller chain—cuts your drive and conveying costs.

Near you is a Link-Belt office or authorized stock-carrying distributor where you can get full information on the complete Link-Belt range of single and multiple widths, ¼ to 3-inch standard pitch, and 1 to 3-inch double pitch. Ask for your copy of 148-page Data Book 2457.

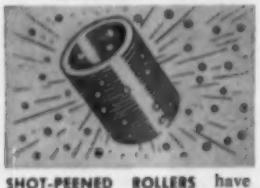
LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,121

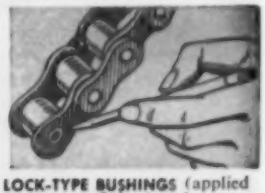
LINK-BELT gives you dynamic strength that comes from these important EXTRAS

PRE-STRESSING of multiple width chain provides uniform load distribution.



SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.

CLOSER HEAT-TREAT CONTROL —coupled with rigid testing insures uniformity.



LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.

Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ... and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned ... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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Subsidiary of The Colorado Fuel and Iron Corporation

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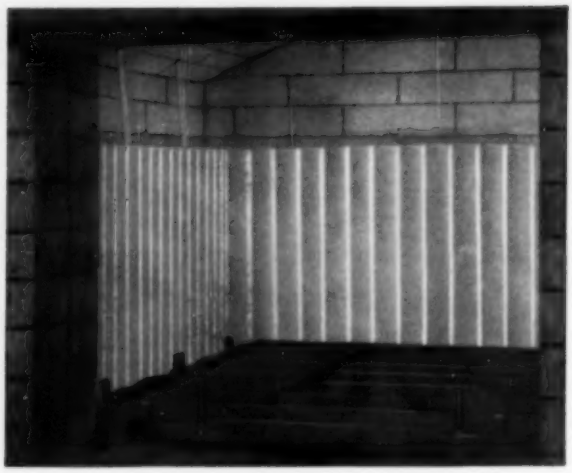
If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork truck.

Whatever your source of heat...

LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES



. . . IN THE GAS-FIRED FURNACE

NEW LINDBERG VERTICAL RADIANT TUBE

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special protective coating gives greatest possible resistance to carbon penetration. Vertical position eliminates soot deposit and resultant temperature increases at points of sooting.

Tubes are 59 inches long, weigh only 29 pounds, changeable in a few minutes. No costly furnace shutdowns nor high labor and material cost for tube changes.

. . . IN THE ELECTRIC FURNACE

NEW LINDBERG CORRTHERM ELEMENT

CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available for heat treating furnaces. With this new element carburizing and carbonitriding with electricity becomes practical, efficient and economical. Ideal, too, in other types of Lindberg electric furnaces.

The outstanding feature of the CORRTHERM element is the extremely low voltage at which it operates. Consequently, leakage through carbon saturation and shock or short hazards are eliminated. Elements also act as baffles to direct circulation of convection streams.

CORRTHERM elements are practically indestructible. Work load or operator's charging tool can't hurt them. Watts density is at all time low. Easily installed or replaced, too, as element merely hangs in furnace and no complicated mountings are required.

Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.

LINDBERG FURNACES

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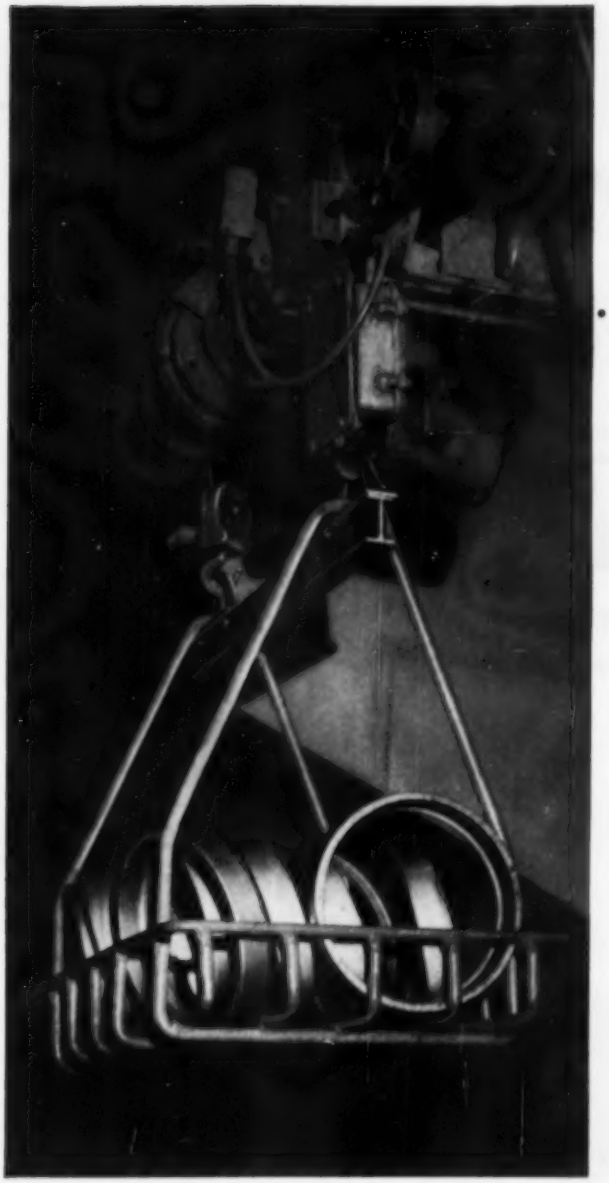
15 times the life in Acid Mixtures

AND STILL GOING STRONG



PROBLEM:

Baskets for submerging alloy steel forgings in hot pickling acids had to be replaced every month because of severe corrosion. The baskets were continually immersed in either 15 per cent hydrochloric acid, aqua regia, 10 per cent nitric and hydrofluoric acids, or 20 per cent nitric acid. All of these acids were at about 140 deg. F.

REMEDY:

The baskets were made of one-inch round bars of HASTELLOY alloy C.

RESULT:

After 15 months' service, three shifts a day, the baskets made of HASTELLOY alloy C are still good.

HASTELLOY alloy C is the most universally corrosion-resistant alloy available today. It has high-strength and is highly resistant to all of the mineral acids. For a copy of a booklet describing HASTELLOY alloys, get in touch with the nearest Haynes Stellite Company office.

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the modern bee uses

CF&I-WICKWIRE WIRE!

Modern bees have stopped storing honey in handy hollow trees. Instead, they choose man-made hives—hives which are neatly divided by wood and special round, tinned, hard drawn, low carbon CF&I-Wickwire Bee Wire.

Chances are you don't need wire to make bee hives. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York
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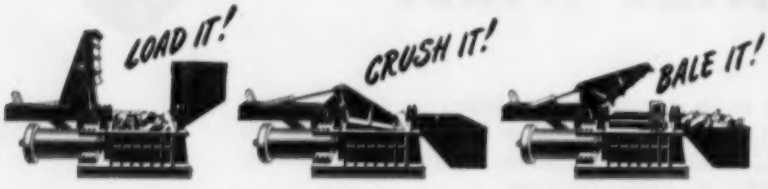
CF&I

4239

Now Dempster-Balester Presses offer you PUSH-BUTTON scrap metal baling!

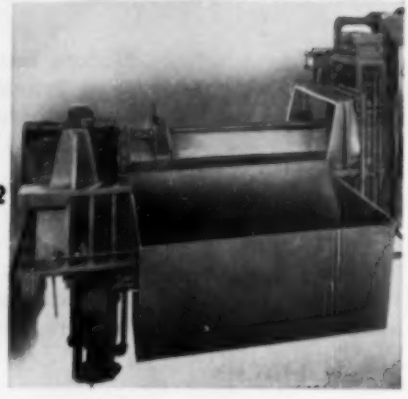
ONE MAN can PUSH-BUTTON-OPERATE one or several Dempster-Balesters! One press may be the Dempster-Balester Model 129. Another the Model 351. Another the Model 701, etc. Each may be the same model, or there may be several of one model, one of another.



IN ADDITION, one or all may be fully equipped with exclusive Dempster-Balester Auxiliary-Compression Door that enables you to bale in a 1-2-3 continuous cycle (see LOAD IT, CRUSH IT, BALE IT illustrations above). This Auxiliary-Compression Door does not "beat" or "Tamp" the scrap. It actually penetrates into the charging box, hydraulically compressing the scrap with a 45-ton force.

1

2



PUSH-BUTTON PANEL

3

Photo 1 shows push-button controlled Skip Pan dumping load into charging box. Skip Pan returns to be re-loaded and (Photo 2) Charging Box Door moves out, pushing last bale forward, clear of charging box. Bale ejector returns to lowered position. Pusher rams proceed to bale the scrap and then automatically retract. Charging Box Door opens (see Photo 3), bale is ejected and Skip Pan, which has been re-loaded, is ready to dump another load into box for baling.

DO YOU NEED one Dempster-Balester or several? What model? With or without Auxiliary-Compression Door? With or without push-button control panel? Should your press produce one particular size bale, or be equipped to produce different size bales? Isn't it time we got together? Tremendous savings are yours with the right press, properly engineered and equipped to meet your particular requirements. Ask us to give you complete information. *A product of Dempster Brothers, Inc. Sold in Canada by the W. P. Favorite Co., Ltd., 418 Main Street East, Hamilton, Ontario.*

DEMPSTER BALESTER®

DEMPSTER BROTHERS, 686 Dempster Bldg., Knoxville 17, Tennessee

Weirzin's tightly bonded zinc coating takes the deepest draws with ease—does not crack, peel or flake under the severest fabricating operations.

Weirzin's malleable zinc coating lubricates dies without leaving a zinc deposit—reduces die maintenance—increases die life.

Weirzin, chemically treated, takes and holds paint, enamel, lacquer and lithographic ink indefinitely—eliminates underfilm corrosion.

Weirzin stops inventory losses due to rust—eliminates pickling—reduces cleaning and buffing—cuts handling before, during and after fabrication.

How to wrap up product superiority...at lower cost

Weirzin

electrolytic zinc-coated sheet

No matter how extreme the stresses of fabricating operations, electrolytic zinc-coated Weirzin stands up under them. Its tightly bonded malleable coating flows so smoothly with the ductile steel base during a deep draw that Weirzin seldom needs additional coating for corrosion protection.

Here is a different kind of steel sheet. For ease of fabricating, for durability, for long-range economy, no other "similar" metal measures up to Weirzin. Weirzin is produced in a continuous strip up to 36" wide. It is available in coils or cut lengths down to ½" strip—gauges .010 to .0478. Phone or write now for the money-saving, customer-pleasing facts about Weirzin!

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

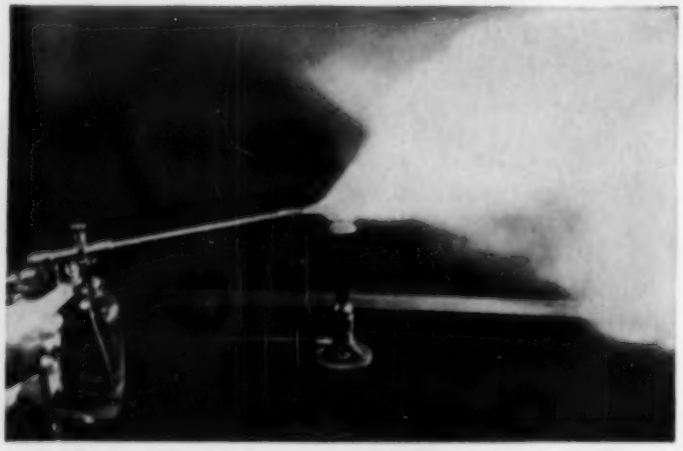
a division of

NATIONAL STEEL CORPORATION

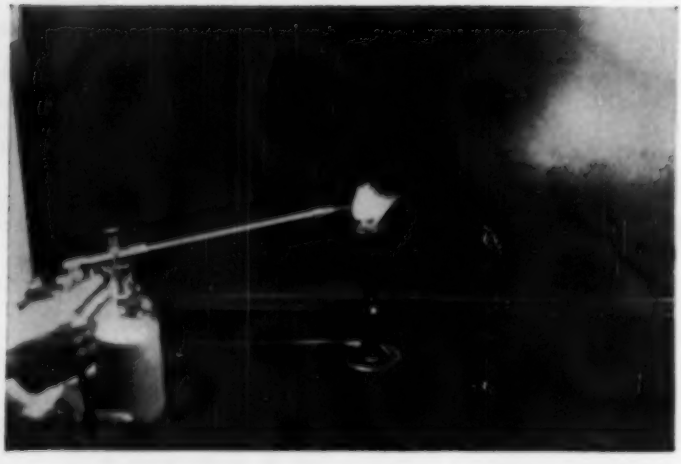
Announcing...the First

HYDRAULIC

Flame tests prove its fire-snuffing ability



This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.



In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.

SHELL IRUS FLUID 902

Oil-Base fire-resistant

FLUID SHELL IRUS FLUID 902

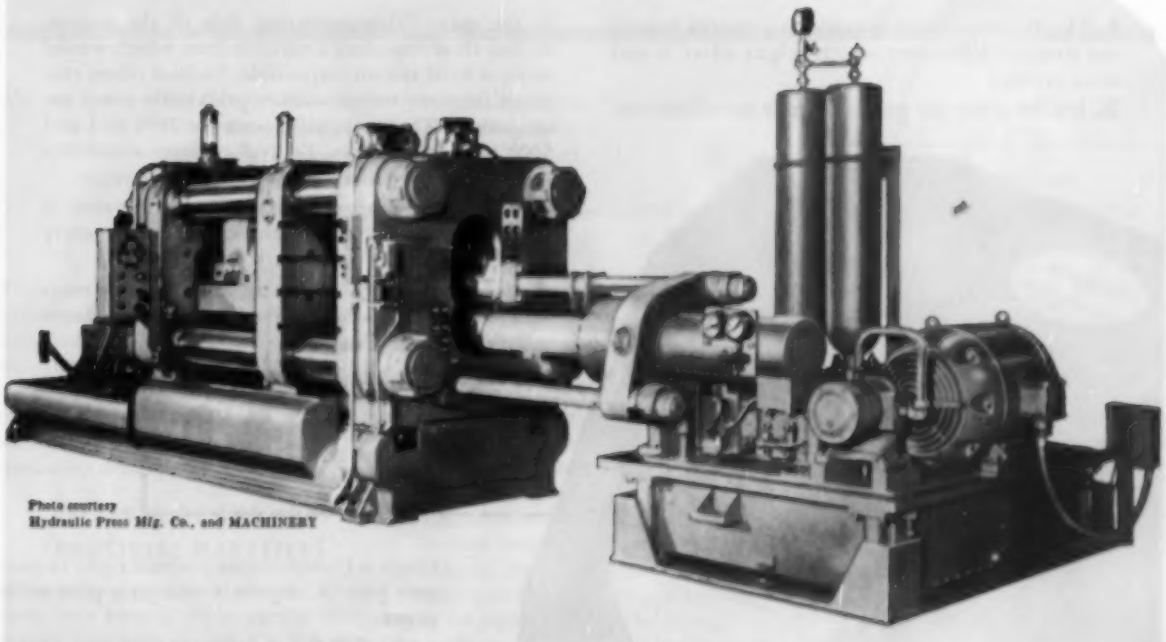


Photo courtesy Hydraulic Press Mfg. Co., and MACHINERY

AFTER THREE YEARS of intensive research, field application and evaluation, Shell Irus Fluid 902 is now commercially available for use in industrial hydraulic systems. While its cost is far lower than other fire-resistant fluids, its performance is comparable.

No major modification of equipment is necessary. Shell Irus Fluid 902 is a special formulation containing no corrosive ingredients . . . no adverse effect on seals or fittings. It is a direct replacement for hydraulic oils now in service.

Noncorrosive, and nonrusting. Steel and copper panels immersed in Irus Fluid 902 for one week at 160°F have shown no significant signs of corrosion. Rusting has not been a problem in long-continued field tests.

This is an efficient fire-snuffing hydraulic fluid that can be widely used. Send coupon for details.

SHELL OIL COMPANY

50 WEST 50 STREET, NEW YORK 20, NEW YORK

100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

SHELL OIL COMPANY
50 West 50th St. New York 20, N. Y. or 100 Bush St. San Francisco 6, Cal.

Please send me test data and information on Shell Irus Fluid 902.

Name_____

Company_____

Address_____

_____

STABLE ACCURACY

THE MOST IMPORTANT REQUIREMENT IN GAGING

The basic design of the Dimensionair is different from that of any other Air Gage. It "repeats" measurements precisely and constantly hour after hour because —

1. The Dimensionair's balanced air system *cancels out pressure variations* which might affect it and cause errors.

2. Unlike other air gages, there is no adjustment in the magnifying-measuring side of the system. Rather than introduce a variable here which would make a fixed system impossible, Federal offers two magnifications which answer practically every requirement. These magnifications are 2500 to 1 and 5000 to 1. In this way, *Federal achieves a stability which cannot be approached by other air gages.*

3. Because the magnification is fixed, the *scale is linear* and the graduations can be accurately calibrated.

4. Hence, with no adjustment to change the magnification and affect the stability, only a single master is required.

Try It!

Check a Dimensionair yourself right in your own plant. Compare it with your present air gages.

a. **Check it for stability** or "repetition". Do this frequently and over long intervals, always using the same master. Avoid temperature effects (excessive handling, direct sunlight, etc.). Notice how quickly you can set the gage to zero.

b. **Check its calibration** using any number of masters. Confirm the fact that only one master is needed. See how dependable the Dimensionair really is.

Ask us or our salesmen to let you try a Dimensionair

Federal Products Corporation
6218 Eddy Street, Providence 1, R. I.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .
Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

Do You Invest Too Much or Too Little in Advertising?

Do you know—*The "Profit Planning" method for developing the budget?*
Four management tests for advertising budgets?
The 42 check points in developing a budget?
The seven steps in the "Task Method?"
The twelve questions preceding a budget presentation?

These and other questions are covered in "How to Establish the Budget for Advertising Industrial Products"—Report Number Three of the Industrial Advertising Research Institute. This study, made exclusively for the Institute, is based on a survey of how 64 successful industrial companies developed their budgets.

RESEARCH BY AND FOR INDUSTRIAL MARKETERS

Other subjects related to industrial advertising have been or are being studied by Project Councils of the I.A.R.I. (See Box) Projects are planned and developed by teams of experienced industrial advertising and marketing men.

SHARING THE COST OF RESEARCH TO IMPROVE INDUSTRIAL ADVERTISING

The Institute was established in 1952 by the National Industrial Advertisers Association as a non-profit impartial organization to study means of increasing the efficiency of industrial advertising. Participating companies pay fees based on the size of their industrial advertising budget or the amount of business handled. This cooperation allows I.A.R.I. to undertake extensive studies. I.A.R.I. subscribing companies receive these studies.

Because hundreds of companies share in the cost, the Institute can retain experienced research organizations for all projects. All reports are sent to subscribers; and, since subscriptions are based on the size of the industrial advertising budget of the company, agency, publisher, or supplier, all share the benefits at nominal cost.

Write now for the new booklet, "The Door to Marketing Progress." It gives complete information on the Institute, its organization, work, and projects, details on costs and benefits and current list of subscribers.

REPORTS PUBLISHED

- Methods for Handling and Evaluating Inquiries
- Bibliography of Information on Handling Advertising Inquiries
- How to Establish the Budget for Advertising Industrial Products
- Yardsticks for Evaluating Industrial Advertising Research
- Organizing and Controlling the Industrial Advertising Operations

PROJECTS UNDER DEVELOPMENT

- Use of Market Evaluation Methods in Developing the Industrial Advertising Plan
- A Study of Expected Variation in Readership Scores of Paired Ads
- Evaluating Industrial Exhibits Techniques
- Establishing and Maintaining Direct Mail Lists
- Effective Coordination of Advertising and Sales in Marketing Industrial Products
- Application of Motivation Research to Industrial Advertising
- Techniques and Standards in Mail Readership Studies
- A Statistical Study of Copy Characteristics
- Audience Characteristics in Industrial Advertising Readership
- Grants-In-Aid for Research on Industrial Advertising in Universities and Colleges

I.A.R.I.

INDUSTRIAL ADVERTISING RESEARCH INSTITUTE
17 Chambers Street
Princeton, New Jersey
"Research to reduce the cost of selling."

INDUSTRIAL ADVERTISING RESEARCH INSTITUTE
17 Chambers Street, Princeton, New Jersey

I'd like to know more about the IARI. Please send me your new 24-page brochure explaining the purpose, plans, people of the Institute, and a schedule of subscription rates and benefits.

NAME_____

FIRM NAME_____

STREET ADDRESS_____

CITY_____ STATE_____

Pickling Department, Wheatland Tube Company, Wheatland, Pa., producers of quality steel pipe and tubing. Monel alloy tie-rods keep wood tanks tight; acid loss to a minimum.

Third time around for a Monel tie-rod ...and take-up threads still sound!

This man is tightening tie-rods on a pickling tank at the Wheatland Tube Company. They're Monel* nickel-copper alloy tie-rods. Many have outlasted two tanks and are now keeping their *third* tank tight . . . leak-free!

These tanks average four years' service. That means many of these Monel alloy tie-rods have lasted twelve years or more!

You save acid . . . save money when tanks stay tight

You can keep tanks tight with Monel alloy tie-rods. Monel alloy does not dezincify. Take-up threads stay *strong*. All *sound* metal. They hold up under tensions developed by tightening and by swelling timber. You can depend on that!

You can also count on the same dependability from other Monel pickling equipment. Chains, eyebars, pickle pins, and pipe, for example.

And this wrought Monel can be fabricated to any practical design. It's easily welded, too.

Look at this evidence that Monel threads stay sound. When you need take-up thread, you have it, on Monel tie-rods.

* * *

Pickling equipment suggestions available

A 32-page Inco booklet, "Equipping the Pickle House for Greater Production at Lower Cost", tells you how to take advantage of Monel in *your* pickling department. Filled with illustrations and performance information. Write for it today.

*Registered Trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Monel... *for proved pickling life***

STEEL
August 20, 1956

Metalworking Outlook

Ore Boat Strike: Trouble Looms

Should the strike at Pittsburgh Steamship Division of U. S. Steel Corp. last through the middle of September, say spokesmen, sufficient ore could be lost to hamper the corporation's steel operations next winter. Last week, settlement seemed no nearer. Unions still deaf-eared the demand that a secret ballot be held to determine their right to represent employees. Pittsburgh Steamship flew supplies to picketed boats by helicopter. Although not everyone is struck, unions demanded conferences with companies operating 80 per cent of the Great Lakes ore fleet.

Fast Taxes for Steel?

U. S. aid for steel company expansion plans looks a little more remote with the Defense department ruling that Jones & Laughlin's proposed tubing plant at Houston will not be considered a production facility for military and atomic energy goods. But there still are signs that the freeze on fast tax amortization may be beginning to thaw. Some observers anticipate that Office of Defense Mobilization may make exceptions for tubing, structural steel and plate producing facilities when it completes a current survey. J&L's application is being shelved pending completion of the study.

Money To Cost More

Look for the money squeeze to get even tighter. To counteract the possibilities of inflation, the Federal Reserve Board is set to raise its discount rates again. Competition also is forcing up the price that business must pay for what money it can find. Ford Motor Co., for example, will have to pay about 4 per cent interest to get the $300 million it wants in additional capital funds.

Handling Equipment Boom

Material handling equipment producers are riding high. In June, new orders soared to a rate of 189 per cent of the 1954 average, compared with May's 145. Average new orders for the year are running at 151, compared with 121 in 1955. The current boom is attributed to the general expansion of industry, the auto model change-overs, large orders from appliance makers and the growing impact of the national highway program.

Who Gets Time Off To Vote?

Do you know the laws of your state? Twenty-seven states and two territories have laws providing that employees may take time off to vote: Alabama, Alaska, Arizona, Arkansas, California, Colorado, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, Nevada, New Mexico, New York, Ohio, Oklahoma, South Dakota, Tennessee, Texas, Utah, West Virginia, Wisconsin and Wyoming. Although the laws vary, they follow a pattern: 1. Prior application by the worker is necessary. 2. In 17 of the 29 states and ter-

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ritories, the employer cannot deduct the time off from the worker's regular wages. 3. More than one-third specify 2 hours off. 4. All but two states provide penalties against employers violating the law.

Canada Thrives

Canada's boom shows few signs of slowing down. Compared with the slump here, auto sales are forecast at 400,000 for the year, up from 387,000 in 1955. General Motors is leading the sales race, with Ford and Chrysler neck and neck for second spot. Economic observers, however, match their American counterparts in worrying over inflation. There's a new round of wage increases in Canadian steel.

New Model for Ford

To compete saleswise against Buick and Oldsmobile, Ford Motor Co. will introduce a new line—the "E"—before the middle of next year. Initially, it's expected that the new car will be marketed in just one model, though there may be seconds later. Likely innovations are air suspension and a retractable hardtop roof. Sales offices will be set up for the car next month in Chicago, Detroit, Newark, N. J., New Orleans and San Francisco. William C. Ford is a good bet to head up production.

IRS Rules on SUB Plans

Supplementary unemployment benefits (auto type) are not wages for purposes of unemployment taxes, social security and withholding of income taxes, says the Internal Revenue Service. SUB payments, however, must be included in gross income when the worker files his income tax return. Such plans as the glass industry's (where individual accounts are set up), are treated differently: The worker pays income and social security taxes on the amount credited to his account; the employer pays social security and unemployment taxes.

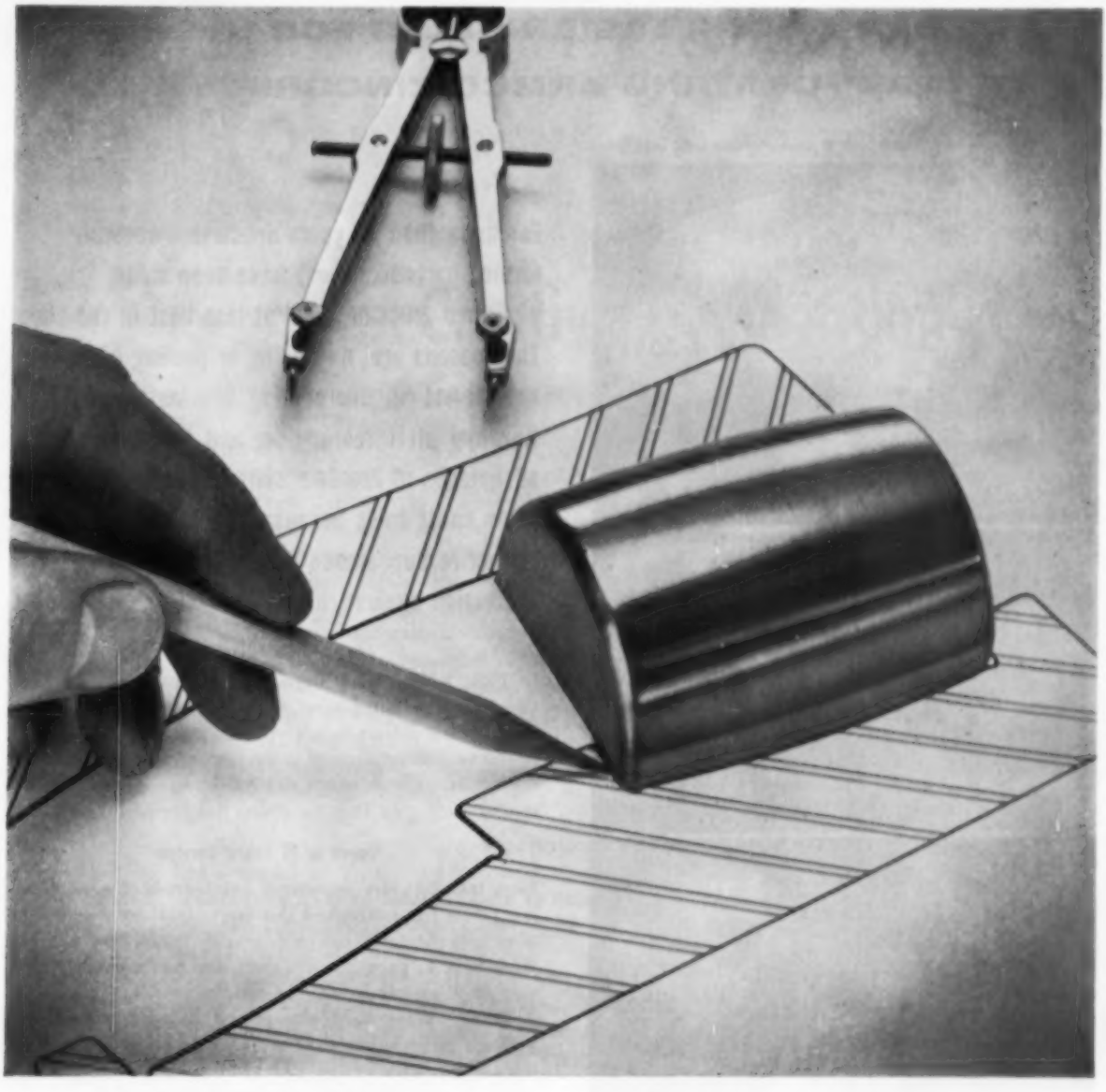
Tax Saving Possibilities

Check these changes in the Internal Revenue Code for possible tax savings: 1. Contributions to medical research organizations are deductible for income tax purposes. 2. Real estate investment trusts will be taxed under a special method. 3. Costs of acquiring and protecting trademarks and tradenames may be amortized over a 60-month period.

Straws in the Wind

Social security taxes go up to 2¼-per cent of earnings (up to $4200 annually) on Jan. 1, 1957 . . . Gross national product hit an annual rate of $408 billion in the second quarter, a new high . . . Jessop Steel Co.'s purchase of Green River Steel Corp. will be completed in 60 to 90 days . . . Kennecott Copper Corp. hired Horizons Inc. to build and operate a pilot zirconium plant in Cleveland . . .University of Michigan is studying the methods by which the steel industry can finance its expansion . . . Highway Trailer Co. has an experimental trailer with side walls and roof of translucent plastic.

TORRINGTON *SPHERICAL ROLLER* BEARINGS



What a difference *conformity* makes!

TORRINGTON SPHERICAL ROLLER BEARINGS have the right degree of conformity between rollers and races and between roller ends and the center guide flange. "Skewing" is eliminated and rollers operate with a minimum of friction. This means even load distribution and long, low-maintenance service.

Because of their excellent performance in heavy-duty application, Torrington Spherical Roller Bearings have won wide acceptance in rock crushers, cranes, paper machinery, drilling rigs, presses—wherever high load capacity is required under conditions of misalignment.

Torrington Spherical Roller Bearings are available with either straight or tapered bore, for shaft or adapter mounting. And Torrington engineers have wide experience in custom-building bearings for special applications. Whenever you need bearings, call on TORRINGTON.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District offices and distributors in principal cities of United States and Canada

90th ANNIVERSARY 1866 1956

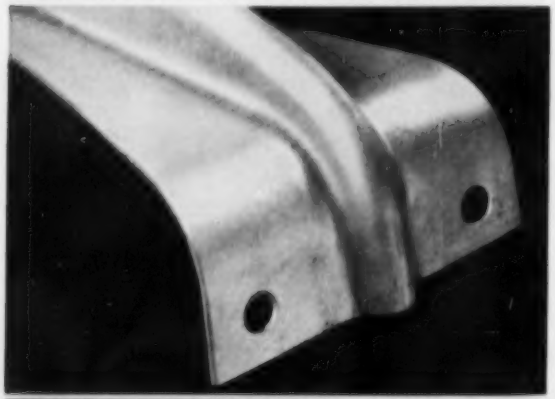
TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller
Needle • Ball • Needle Rollers

Here's a 20-year service record of

LOWER COSTS, EASIER SALES FOR USERS OF DEEP-DRAWING ARMCO ZINCGRIP STEEL

Products such as these have been made of Armco ZINCGRIP Steel since 1936.



For more than 20 years drawn and severely formed parts like these have been made of Armco ZINCGRIP Steel at less cost in the shop. The reasons are: no flaking or peeling of the special hot-dip zinc coating, elimination of finishing after fabrication, and the production advantages of ZINCGRIP coils. ZINCGRIP also helps boost sales because of its attractive appearance and unbroken protection against rust.

In 1936, when Armco introduced ZINCGRIP, the *first* continuously zinc-coated sheet steel, designers and production men found it difficult to believe that a zinc-coated sheet could be drawn without damage to the coating. But a few trials—reverse draws, lock seams and roll forms—proved that the special coating on ZINCGRIP didn't flake or peel.

Proved in 20 Years' Service

More than 20 years' experience in hundreds of manufacturing plants has established this fact: *Anything that can be done with sheet steel can be done with Armco* ZINCGRIP. You don't have to baby it in the shop, and its formability gives you much greater freedom in design.

Twenty years have also proved that ZINCGRIP resists yellow rusting longer than ordinary galvanized. This, plus the smooth, attractive surface of ZINCGRIP, makes products easier to sell and keeps your customers satisfied.

ARMCO STEEL CORPORATION

ARMCO®

1826 Curtis Street, Middletown, Ohio • Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

Creative Competition

With the new wave of inflationary prosperity enveloping the economy, many in industry are overlooking the subtle encroachment of what we call creative competition.

We define it as the application of technical know-how, imagination and knowledge of markets to the development of new and better products that have sales appeal to industry or the ultimate consumer.

People who practice it do not let "good times" lull them into a false sense of security. Here are a few examples of their work:

Improved high strength steels for two-piece welded wheels for the new autos. The machining and measuring of pistons to such close tolerances that they will retain liquid pressures of 60,000 psi. Presses that extrude 525 auto parts an hour. Transistor-powered radios that do the same work as their obsolete big brothers on midget flashlight batteries. One home appliance that washes and dries clothes.

People who practice this way of doing business know that it is more than a self-improvement program. It is a way of doing things that has an impact on the entire economy.

This kind of competition helps to explain the steady growth in the nation's output of goods and services. Our gross national product reached a peak annual rate of $408.3 billion in the second quarter—$4.9 billion better than the figure for the first quarter, $20.9 billion better than the figure for the second quarter of last year.

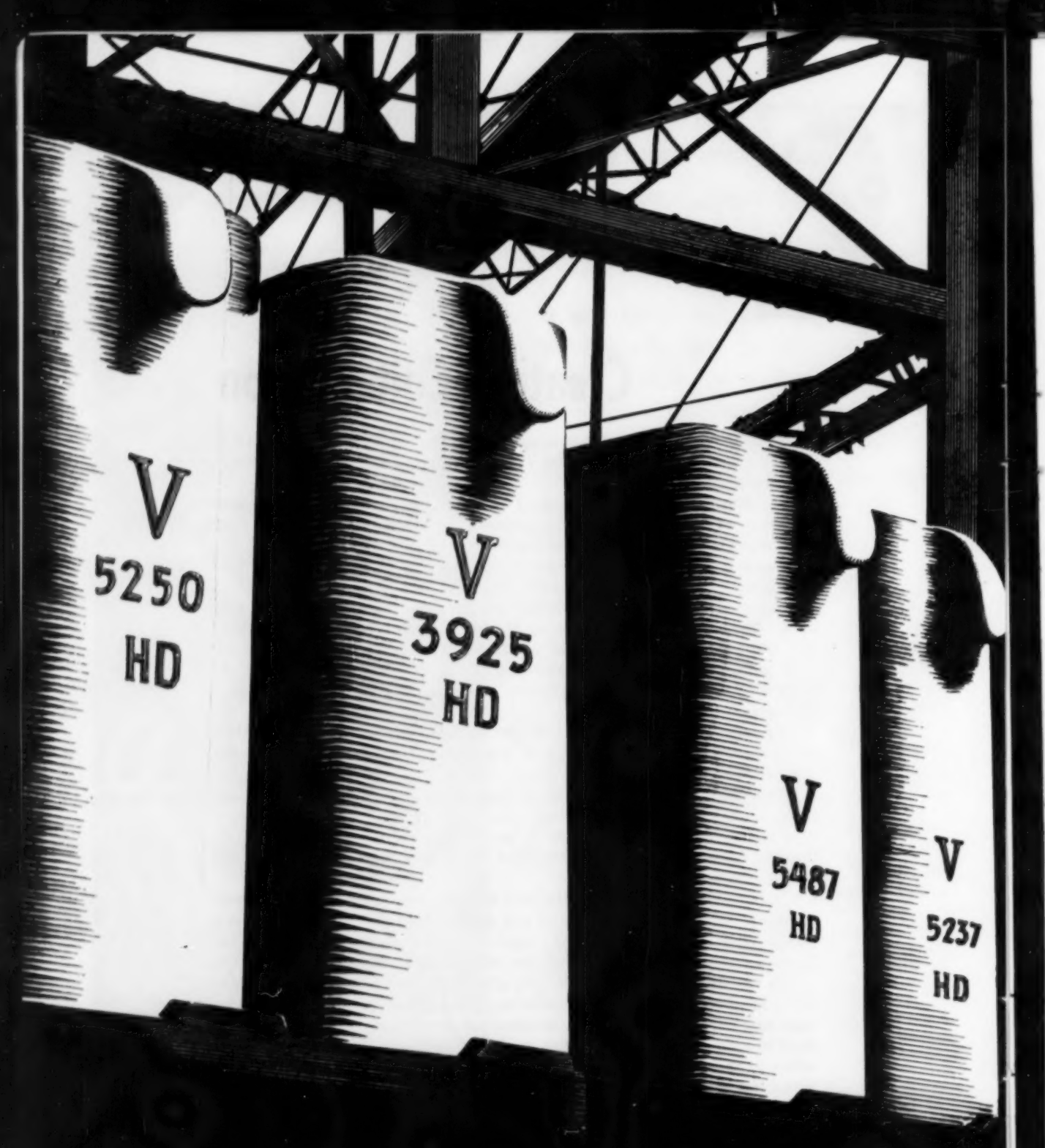
About half the current increase was due to a gain in the volume of goods produced. Certainly, the creation of new demand through creative competition played a big part here. And don't overlook another important factor in the increase: Business spending for efficient new plants and automated equipment.

In the current quarter, the loss of 10 million tons of steel production has had little effect on the rest of the economy. Industry, with few exceptions, has been operating at top speed on accumulated inventories. The GNP for the third quarter could be $408 billion to $410 billion, and $410 billion to $412 billion in the fourth quarter. In 1956, GNP may average $408 billion to $409 billion, topping last year's record $391 billion.

Of course, higher prices on a myriad of products will account for a good share of the increase, but don't forget to read creative competition into the results.

New materials, components, processes and finished products create new demand for industry to live and grow on. Don't be misled by this pleasant aura of prosperity and well-being.

Irwin H. Such
EDITOR-IN-CHIEF

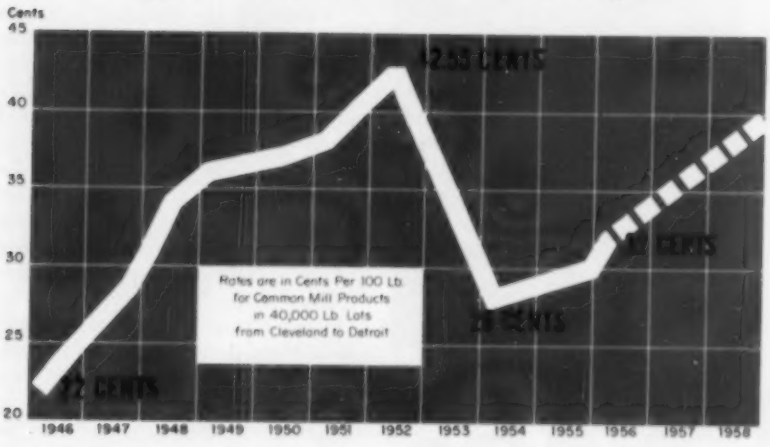


VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

Freight Rates: Headed Up Again



Freight Increase Coming

Eastern railroads are starting a drive for a rate increase of between 5 and 10 per cent on steel and other products. It could become effective either this fall or early next year

THE AVERAGE $8.50 a ton hike in steel prices isn't the only higher cost facing metalworking. A substantial new round of freight rate increases is in the cards.

Eastern railroads are asking for a boost of between 5 and 10 per cent. It's a good bet that they will be able to settle above their minimum asking price.

Stage-Setting—The chart above shows how freight rates for common mill products (bars, plate, sheet and strip) have behaved since 1946. They headed steadily up until 1952. Then they took an abrupt nosedive when the Interstate Commerce Commission granted a new schedule which recognized the increasing competition of motor haulers. Since 1954, the trend back up has been steady.

The latest increase, 6 per cent, was granted last March. It raised the cost of a ton of steel hauled from Cleveland to Detroit from $6 to $6.36. A further 5 per cent increase would put the price up to $6.67. If the ICC allows 10 per cent, the new rate would be approximately $7.

Other hauls: From Buffalo to Albany, N. Y., parallel cost figures are $9.40, the new rate would be either $9.87 or $10.36. From Chicago to Milwaukee, cost would be either $4.41 or $4.62.

Timing—It's hard to predict when the new increase will come. The eastern roads, which are spearheading the drive, are asking relief from higher operating costs incurred before and since the March rate hike. Other regions, like the southern and western groups, have so far indicated that they would prefer to wait for pending wage negotiations to be settled before petitioning for a new increase.

But talk is that the eastern roads can't wait. Some 20 major contracts have to be settled before this year's rail negotiations can be closed. The first will be coming to the talking stage Sept. 5 in Chicago.

Possibilities—Usually, rail wage talks drag on for as long as three months, and may last six months or more if serious hitches develop.

Three things could happen. ICC could give a temporary boost to the eastern roads to cover their special problems, then allow for it in a general increase next year, when new costs can be estimated nationally. If the roads can get together on its necessity, there could be an immediate boost in rates on a national basis. Either way, as happened last March, an attempt probably will be made to speed up the effective date of the increase. Higher tariffs would be filed to take effect in perhaps 30 days unless blocked by ICC.

The third alternative: All railroads could decide to postpone their requests until next year. Such a course would only delay the inevitable hike. And a delay is unlikely.

Trap — Railroads are being squeezed hard by mounting costs. Despite increased loadings this year, many of them are suffering a net loss in income from 1955. They plan a long-term program to improve their equipment, which will cost them some $6 billion over the next five years. Their freight car order backlog alone stands at over 120,000 cars, which will cost them some $875 million.

Outlook—To hold their profits at present levels, the roads will have to up freight charges. Other carriers will follow suit.

Some metalworking companies will be hurt more than others. The increase will fall hardest on those companies—like screw machine products, fasteners, steel shipping containers—where freight of both raw materials and finished product represents the highest portion of the selling cost. Many of them will be taking a tip from one aluminum company executive who said earlier this year: "We'll be reviewing our freight situation plant by plant. We may well find places where we would be ahead to dispense with the common carriers and put in our own truck fleets."

Gould-National Batteries Inc.

Dry charges and 12-volt systems put life in . . .

Replacement Sales Rise

THE nation's largest consumer of lead, the auto storage battery industry, is counting on a banner year. Retail sales (original and replacement) are expected to ring in at about $700 million in 1956 —some $25 million better than last year's mark. Anticipated growth should bring the figure up to $850 million by 1960.

Strength is coming from replacement sales, says five of the large producers — Gould-National Batteries Inc., Trenton, N. J.; Delco-Remy Division, General Motors Corp., Anderson, Ind.; Electric Auto-Lite Co., Toledo, O.; Electric Storage Battery Co., Philadelphia; and Bowers Battery & Spark Plug Co., Reading, Pa. They note a 25 per cent improvement in replacement sales, comparing first half performances in 1955 and 1956.

Original equipment sales have slipped this year because car production is off 1955's pace.

Competitive—The battery business was fairly stable until General Motors introduced the 12-volt, six-cell battery on its top models in 1953. This year, every major line of cars boasts such a system.

Gould reports: "In 1956, approximately 10 per cent of the replacement market will be in 12-volt batteries. By 1960, we expect the figure will be 50 per cent; by 1965, only about 20 per cent of the replacement market will be using the 6-volt type."

Longevity — Another factor in the sales race for the changing market is longer battery life. According to Gould, the average age of a battery has been increased from 21 months (1947) to about 27 months. Manufacturers are developing better grid metals, different cell separators and simplified assembly processes to keep ahead of the game. Lead producers are doing research, too.

Probably the biggest innovation in battery design has been the development of dry charged batteries. These units are shipped to distributors without acid. They're activated when sold to the retail customer.

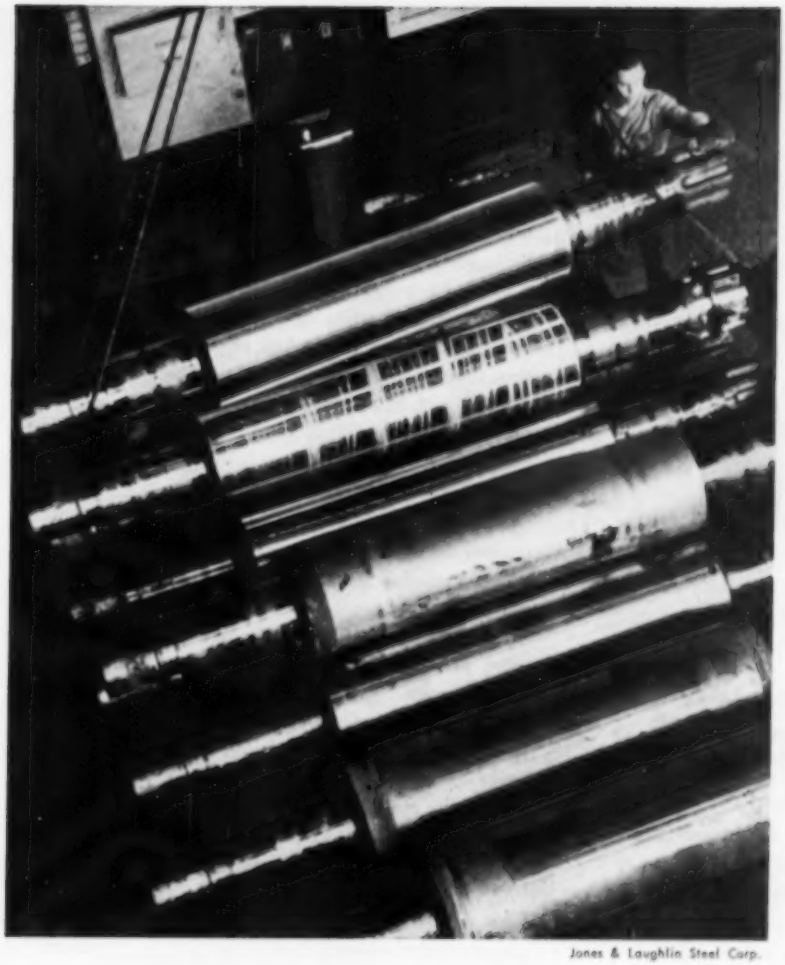
Advantages — Explains T. L. Kendall, publicity director, battery engineering and replacement battery sales, Delco-Remy: More economical and safer handling and storage methods can be utilized with acid free batteries. Production schedules can be divorced from shipping schedules. Dealers can do away with messy and costly trickle chargers.

Rebuttal—Although most companies make dry charged units, not all are as enthusiastic as Delco-Remy. One executive points out that initial costs of wet and dry units may be comparable from factory to dealer, but from there on, an extra 6 to 8 per cent charge is tacked on to the dry models to cover the cost of charging acid.

"We make both kinds, but when you consider cost and handling time, it looks like the dry charged batteries will be restricted to slow moving types. In batteries with a fast turnover (one model can account for 20 per cent of a company's sales), it isn't worthwhile to use the dry charge," he asserts.

Other Factors—Before 12-volt systems came along, five basic sizes covered most of the market. Now there are about 14 basic groups, and more may be added this year.

The industry has production problems, too: An excess of capacity. But with more cars on the road every year, it should be utilized within the near future.



Jones & Laughlin Steel Corp.

Though steel strike lopped off one month's demand . . .

Roll Shipments Stay High

UNDAUNTED by a strike which destroyed chances for a record sales year, rollmakers expect to exceed 1955's shipments by 10 per cent this year.

They shipped 103,000 tons of steel and iron rolls in the first six months, near the record pace in 1951, when sales topped 218,500 tons. Shipments in the same period last year were 84,000 tons. In 1954's first half, they were only 58,000 tons.

"Demand was firm up to the time of the strike, and it will be strong in the last months of this year," states Clark H. Johnson, vice president-sales, United Engineering & Foundry Co., Pittsburgh.

Help Here—The strike did have a bright side: It gave some rollmakers a chance to trim order backlogs. As one explains: "Long backlogs of unfilled orders made it difficult for us to meet delivery promises. In slack periods, iron rolls can be cast in six to ten weeks, and steel rolls can be delivered in 12 to 14 weeks. Late in June, we were promising delivery of iron rolls in 18 to 20 weeks and steel rolls in 20 to 24 weeks."

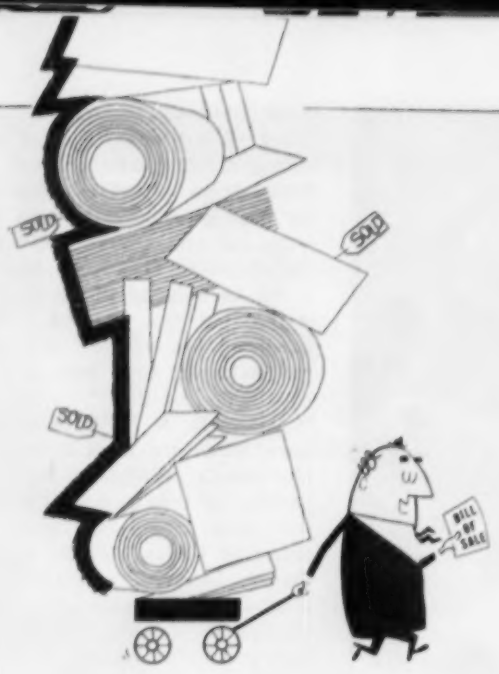
Short Lull—But orders did not come to a halt during the strike. Derek G. R. Brigg, general sales manager, Midvale-Heppenstall Co., Philadelphia, reports: "Bookings for first six months of this year increased our backlog of orders for alloy steel rolls. We expected to cut our backlog during the steel strike, but we received several good tonnage orders. We think roll sales in 1957 will at least equal those of 1956."

Agrees B. A. Kline, sales manager, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.: "Our backlog of iron and steel roll orders from steelmakers grew considerably in the last six months. During the strike, we supplied tool steel industries with rolls. With production resuming, trends indicate good business for months to come."

Look Ahead — Looking farther into the future, W. J. Wenger, assistant vice president, roll division, Blaw-Knox Co., Pittsburgh, predicts: "If mills expand as they expect to, they will need more rolls for new applications in 1957 and beyond. If they continue to operate at higher speeds and at full capacity, mills will use rolls faster and will require more replacements."

Ohio Steel Foundry Co., Lima, O., paused for a two-week vacation in July, then returned to full production, tackling lengthy backlogs. While some steel mill replacement demand was lost by the strike, J. L. Campbell, vice president, says: "Business prospects look good. About 5 per cent of our dollar volume goes to nonferrous mills. Producers of aluminum, copper and magnesium make a fast-growing market. There's no sign of a slackening in foreign need for rolls. We export 10 to 12 per cent of our output."

Strikes and shortages rule out the possibility of a record-breaking sales year, but labor stability and steel expansion may combine to make new production marks possible in 1957. Roll sellers will agree with J. Ralph Patterson, vice president, Mackintosh-Hemphill Division, E. W. Bliss Co., Toledo, O., who says: "While new orders may be slow until mills return to full production, the outlook is for strong sales in the last quarter and next year."



How To Sell Yourself to the Mill

Give a brief outline of your company's history and its present organization.

- Tell about its size and location.
- Include a photo of the plant if it is particularly impressive.

Tell about your products.

- List them.
- Say something about their quality.
- Mention your means of distribution and size of marketing area.

Show the growth potential of your industry.

- Chart the business volume of your industry over the last several years, and project what it could be expected to be over the next several years.
- Tell why growth can be expected.
- Show what portion of your industry you represent, how your status has changed, what further change is likely and why it is likely.
- Point out any advantages you have in geographic location.

Show how good a customer you will be.

(As long as steel demand is strong, you'll have to appear as a better customer than some of those now on steel mill books, or you aren't apt to get on.)

- Tell how much of various forms of steel you are using yearly. Estimate how much you will need in five years.
- Give proof that you will be a repetitive customer—not just a one-shot buyer seeking steel to cover an out-of-the-ordinary job.
- List how many different forms of steel you will want to buy in mill quantities.

List and describe your plant facilities.

(This will help the mill to make sure you really are a good prospect.)

Want To Be a Mill Customer?

IT takes more than a phone call to become a mill buyer of steel.

There are certain qualifications which distinguish a mill buyer from a warehouse customer. You'll need to show them.

In most of the last 15 years, steel demand has nearly equaled or exceeded steel mill capacity. You generally have to be "accepted" to become a customer. Taking on an additional customer often means the mill has to bump a customer off the list or reduce allotments to others.

How do you become "accepted"?

Package Deal—One way to help yourself is to marshal in your mind all the facts and reasons why you qualify. Set them down in well organized form on paper, and assemble the pages into a brochure. It needn't be a fancy or expensive booklet—a neat typewritten statement will do. Stapling the pages together between a front and back cover will keep them in proper sequence and give the "package" impression values.

Things to cover and points to keep in mind are suggested in the accompanying check list.

Easy Way To Talk—Pages of the booklet will serve as exhibits for you to use in talking to the steel company. Many people find it easier to talk with an exhibit. It gives them something to talk about; it keeps them on the right track. And a booklet can be left with the steel company for further study and appraisal.

Whether you present your case orally or in writing, organize all the reasons why you'd make a good customer for a steel mill.

Be Careful—Don't allow the desire to save a few dollars influence you unduly into switching from a warehouse to a mill for steel. Where

- Give the age of your production equipment.
- Tell what the equipment will do, and what its capacities are.
- Tell what types of inbound transportation reach your plant doors.
- Describe your unloading facilities. (If they are inadequate, you may have to ask for special packaging, which costs extra. It might be cheaper to buy in smaller quantities from warehouses.)
- Describe your steel storage facilities. (Can you handle mill lengths or mill packages of steel? Do you have cutting and shearing equipment to handle mill-size steel? Are your steel storage facilities large enough to accommodate mill quantities of steel, and can you adjust to the lead times of mills?)

Tell about your personnel.

(If you have outstanding engineers or heat treaters, say so. Skilled people spell success and growth for your company.)

Outline your long-range planning.

- Tell what you are thinking about for the future. (Will you broaden or narrow your product lines? Will you expand?)

Provide the steel mill's credit department with data on your financial situation.

(This information can be submitted on a confidential basis. Credit departments also will be interested in the other details in your brochure.)

- Submit a creditworthy financial statement and operating figures for one or more years. (The more information given, the better.)
- You must have ability to meet financial obligations at maturity dates.
- Submit bank and trade references.
- Be prepared to give details about the ownership of your business.

Look to the closest mill that produces the kind and size of steel you require.

(You not only save on freight costs but a mill will know you will not be a steady customer if you have to pay more freight from it than from some other mill.)

Check on steel mill expansion plans in your area.

(The mill making the most expansion in the products you want should be the best one for you to approach because it should be the most likely one to look for your business.)

Don't spread yourself too thinly over several steel suppliers.

(By concentrating your business as far as it is safe, you will tend to offer a volume of business that will be attractive.)

Put all of this information into a well organized and neat package.

(This will give the impression your company is a businesslike operation.)

large quantities of steel are purchased and moved rapidly into production, direct mill purchases offer economies. The American Steel Warehouse Association admits that. There are cases, though, where it's better to be a large buyer from a warehouse than a small customer of a mill—particularly during steel shortages.

A steel user doesn't move in one swoop from the warehouse to the mill level. He progresses a product or two at a time—in accordance with the growth in his usage of the various products. Even the largest mill customers depend on warehouses for some of their requirements.

Compare — A mill quantity of garden variety steels usually is considered to be a minimum of 20 tons. For details on specific products, refer to price extra books of the steel companies, or consult a steel company salesman. It would be well for you to make a thorough comparison of the total costs of steel from the mill and the warehouse.

The American Steel Warehouse Association says you should figure your cost of steel ready for use. In its booklet, "Escaping from the Rising Cost of Possession," the association lists eight "cost of possession" factors which should be used in computing "cost ready for use."

Brighter Outlook—If you are fully convinced that you have become big enough to buy mill quantities of steel, your chances of getting on mill books are improved by using the organized approach. The steel industry is expanding, and it's aiming to have a margin of 15 per cent of its capacity to absorb growing demand. The industry will be looking for additional qualified customers. But it won't take them on willy-nilly. It will do a selective job to make its growth a solid one. It will be up to you to help make the facts available.

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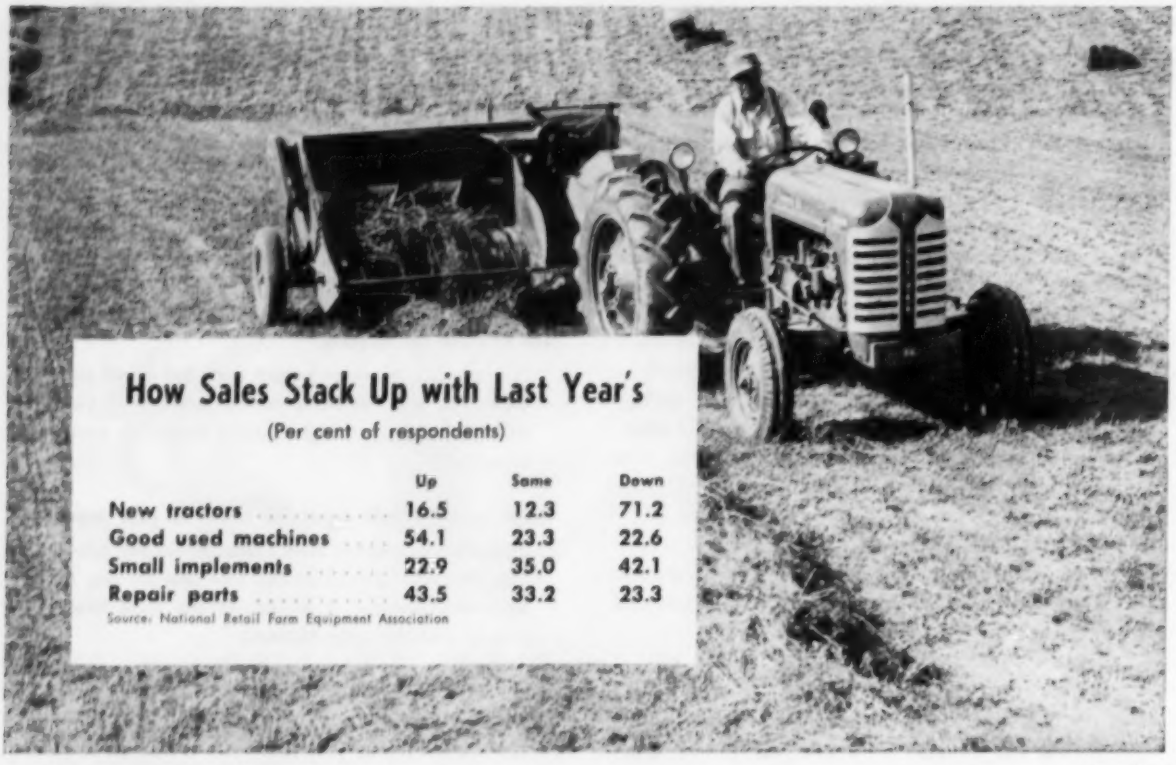

How Sales Stack Up with Last Year's

(Per cent of respondents)

	Up	Same	Down
New tractors	16.5	12.3	71.2
Good used machines	54.1	23.3	22.6
Small implements	22.9	35.0	42.1
Repair parts	43.5	33.2	23.3

Source: National Retail Farm Equipment Association

Oliver Corp.

Farmers Are Buying Again

Despite current layoffs by farm machinery makers, the sales picture is the brightest it has been all year. Weather and the administration's farm program are the keys

THE FARM machinery sales picture isn't as bleak as it looks, report manufacturers and dealers. Business is better than it was a couple of months ago, and there are several signs of good things to come, says Irving A. Duffy, vice president and general manager, Tractor & Implement Division, Ford Motor Co., Dearborn, Mich.:

1. Farm prices are higher than they were at the first of the year. 2. Uncertainty over the federal farm program has ended. 3. The weather has improved. 4. Land prices remain high.

Estimates — Factory sales of farm machinery may range from $1 billion to $1.4 billion this year, 15 to 25 per cent below 1955's total and 5 to 10 per cent below 1954's. But all companies have not experienced the sales slump.

In 1957, sales could go to $1.6 billion, with higher unit prices and more units sold, say sources in the industry.

Causes—There are many reasons for this year's slump. Reduced farm income and drouth get the most mentions. Carl L. Hecker, first vice president, Oliver Corp., Chicago, suggests that price increases are also a drawback. High prices are discouraging sales of self-propelled combines and encouraging custom harvesting, he says. High prices also tempt the farmer to use his machines longer.

Not to be forgotten is the high rate of farm machinery sales since the end of World War II; most farmers are pretty well equipped.

Hit Hardest—While all lines of equipment have been affected, tractors have been hit the hardest. Newer machines are selling the best: Cotton pickers, automatic hay balers, new types of windrowers, forage harvesters and special lines like barn cleaning and dairy equipment. New models have had more sales appeal, too.

Frank H. Hamlin, president, Papec Machine Co., Shortsville, N. Y., says his firm's sales for the first eight months of its fiscal year ending Oct. 31, are 29 per cent ahead of those the year before. Reason: A new low-cost forage harvester. New Holland Machine Co., New Holland, Pa., has introduced multipurpose g r a s s l a n d equipment.

Techniques—Besides new models designed to do a more economical job, International Harvester Co., Chicago, has liberalized sales terms, offered special inducements to buy, stepped up field demonstrations and has given dealers greater incentives, reports John L.

McCaffrey, IH's chairman.

Other manufacturers have intensified their advertising and sales promotions, increased dealer co-operation and modified and liberalized dealer discounts.

New Products—Some manufacturers are well diversified. Others are moving in that direction. L. J. Wolf, vice president-administration, Massey-Harris-Ferguson Inc., Racine, Wis., says his company has introduced a complete line of industrial tractors and attachments.

Deere & Co., Moline, Ill., has a new chemical plant at Pryor, Okla., to produce nitrogen fertilizer. Blair Williams, sales director, New Idea Farm Equipment Co., Coldwater, O., reports his firm is looking to 1957 to introduce some new products outside the farm equipment field.

Retailers are diversifying, too. Farm equipment dealers are selling electric appliances and irrigation equipment, as well as servicing farm equipment other than implements.

Credit Side—Some observers in the industry feel that sales can be stimulated with easier credit, but others think liberalization of terms has gone as far as it can go. Easy credit advocates point out that it is still easier for a farmer to buy a television set than a manure spreader.

Doubters say most farmers already have enough money or the credit to get what they want: There's plenty of house and barn improvement going on even if implement sales are down.

Survey — The National Retail Farm Equipment Association, St. Louis, surveyed 5000 farm equipment dealers this summer. Of 1519 replies, 29.3 per cent reported higher sales this year than last.

Paul M. Mulliken, executive director, believes the last half of 1956 will equal and perhaps surpass the same period in 1955.

The survey showed that farm equipment sales are 12.95 per cent lower than they were in 1955. Because sales in 1955 were 13.2 per cent above 1954's, *Farm Equipment Retailing*, the association's publication, charts 1956's business level equal to 1954's.

Weather was mentioned as the cause for this year's sales slump by about 25 per cent of the dealers surveyed; only 12.7 per cent mentioned lower farm income as the major reason.

Steel Mill Expands

Vanadium-Alloys Steel Co. will double capacity of its plant at Latrobe, Pa.

NEW FACILITIES to produce high speed tool steel are expected to be in operation in 15 months at the Latrobe, Pa., plant of Vanadium-Alloys Steel Co.

Plans call for adding 52,000 sq ft to the structures housing the rolling mills, hammer and melting shops. Included in the program is the installation of 10, 12 and 16-in. rolling mills, plus the necessary equipment for their operation.

Details—Included are roll turning equipment, cranes, shears, heating furnaces, annealing furnaces and the necessary material handling equipment.

All plans for the expansion are completed and approved. Construction is expected to begin soon after the contracts are let. Along with the additional capacity, the expansion will provide greater flexibility to handle increased demands for the company's products.

Products—The firm, founded in 1910, makes hot rolled and hammered bars, upset forgings, ring forgings, plate and sheet, cold drawn and centerless ground bars, precision ground flats, tool bits, drill rod and special cold drawn shapes.

Air Conditioning Grows

THE TREND to air conditioning is becoming a new kind of industrial revolution, says the Trane Co., La Crosse, Wis. Its president, D. C. Minard, believes rising industrial construction figures indicate building not only for increased capacity but also for a modern industrial environment which will cut production costs.

Reasons—Competition for skilled help, the desire to maintain employee efficiency in hot weather and pressure by labor unions all lead to the adoption of air conditioning.

One of Trane's sales offices observes that when General Electric Co. air conditioned its Electronics Park plant at Syracuse, N. Y., four or five years ago it was "able to corral the labor market in that area."

Around the Country—In Boston, Ambrose Burton, vice president in charge of construction for Cabot, Cabot & Forbes, industrial developers, sees a fast trend to air conditioning in factories doing research and development because of the acute shortage of good help, scientific and skilled. Mr. Burton says: "Air conditioning of office areas is recommended to clients as a must."

In San Francisco, the trend is developing slowly because of low summer temperatures in the bay area. But there is a pronounced tendency to arrange for later installations.

Bernard Johnson, Bernard Johnson & Associates, Houston, states: "In the Houston area, air conditioning is as much a part of life as heating is in the colder areas."

Big Growth—The trend is particularly noticeable in the South. Estimates indicate that by 1960 as many as 75 per cent of new factories will be air conditioned. The trend is at its fastest in the textile industry. Consultants estimate that 20 per cent of floor space is air conditioned now, compared with 1 per cent ten years ago.

Oxygen Steel for India

The steel industry in India will use the oxygen converter process under a licensing agreement between its government and Brassert Oxygen Technik A. G., Zurich, Switzerland.

The first license will be issued to the Hindustani plant at Rourkela. Three-quarters of its planned 1 million ton annual production will be made by the process.

Exclusive licensor of the process in the U. S. is Kaiser Engineers Division, Henry J. Kaiser Co. It says U. S. production of oxygen steel will exceed 2 million ingot tons when current installations are complete. Under construction are facilities at the Aliquippa, Pa., works of Jones & Laughlin Steel Corp. and Kaiser Steel's Fontana, Calif., plant.

Small Business Tax Cuts Seem Certain Next Year

LOOK FOR support from both parties to push tax relief for small business through the next Congress. Proposals made in recent months were stymied by lack of active support. New interest stems from the report of the President's cabinet committee on small business. What it has in mind, it says, probably wouldn't cost the treasury anything over the long pull: "$600 million in the first year, about $740 million in the second and somewhat less in later years." Countering those expenditures, says the committee, will be growth in the small business community. Another factor: Some of the proposals call for only a deferral of taxes.

Big Business Gets Break, Too

Significantly, there is no clamor to make big business ante up to cover the loss in revenue. (Most small business relief bills bouncing around Congress at adjournment time did.) Current proposals call for: Reducing the tax rate from 30 to 20 per cent on incomes up to $25,000; allowing fast amortization on purchases of used property (up to $50,000 in one year); giving corporations with only a few stockholders the option to be taxed as partnerships; allowing ten years to pay off estate taxes if the bulk of the estate is invested in closely held concerns; offering more governmental procurement preference for small business; lending encouragement to subcontracting; extending the life of the Small Business Administration; allowing a bigger registration exemption for corporate security issues; simplifying wage reporting; reviewing reports and statistics needed by small business; stepping up federal scrutiny of mergers and tighter enforcement of antitrust laws.

Republican Support for Antimerger Laws?

Proposals on mergers and antitrust enforcement perhaps point the way to Republican support for antimerger legislation that came close to being passed in the closing days of the last Congress. Battle plans to put the measure through in short order next year are already being drafted. Some efforts are being made to overcome industry's objections. For example: Merger prenotification must be treated as secret information by the government's employees. Companies could file suit for a quick ruling if disapproval is threatened. Some exemptions would be provided for transactions occurring in the normal course of business. Foes of antimerger action point out that legislation would make all mergers and acquisitions suspect—that FTC personnel could put out orders delaying mergers without giving specific reasons.

More Defense Uses Coming

A new method of recovering columbium and tantalum from low grade materials has been developed by the Bureau of Mines. Several firms are preparing to put the process on a commercial basis. Big potential uses are in jet engines and gas turbines (columbium) and electronic equipment (tantalum). So far, the Defense department has been holding back because of the uncertainty of a wartime supply of the metals, although there's supposed to be overflowing stockpiles of them.

Wings Take Groundwork

Air Force spokesmen continue to lay the groundwork for a fiscal 1958 budget of $20 billion to $22 billion. Gen. Nathan Twining, AF chief of staff, says the AF needs the increase to hit its goal of 137 wings. Other needs: The fast advancing missile program; more spending for research and development of nuclear airplanes and supersonic heavy bombers. In fiscal 1957, the AF asked for $19.3 billion but received only $16.5 billion.

BDSA Instructs on Priority

Strikebound orders of defense steel calling for delivery in August must be shipped before the end of September, says the Business & Defense Services Administration. Defense orders for September delivery must also be shipped the same month.

Here and There

Shipbuilders can expect $500 million in work again in fiscal 1957, says Clarence Morse, maritime administrator . . . The President's disapproval of $1.6 billion for 99 river, harbor and flood control projects means no loss of business to the construction industry this year. The bill only authorized the projects, didn't put up any money.

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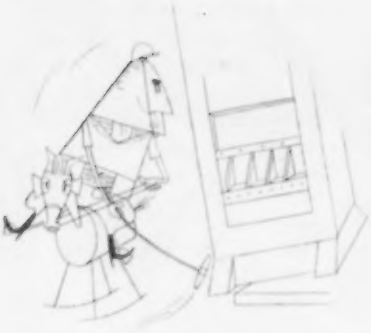

A. D. Beveridge: Streamlined Rigger

HOW DOES a company succeed in the highly competitive machinery erection field? Don Beveridge, 42-year-old president of Commercial Contracting Corp., Detroit, says the answer lies in streamlined handling methods and good housekeeping.

Commercial's sales have skyrocketed from a start of less than $500,000 in 1946, the company's first year of operation, to more than $10 million last year. This puts the company well up among the first 20 firms in this field. Most of the responsibility for this rapid rise rests with Mr. Beveridge, but, as he points out, the company couldn't have made such rapid progress without the help and co-operation of everyone.

Start—He formed Commercial Contracting Corp. to bid on contracts for mothballing the government's wartime machinery.

"It seemed like every plant we went into, I saw rigging outfits using old fashioned hand jacks and wedges to set up heavy machine tools. They left a mess when they finished that plant people had to clean up. I figured that even with no experience, we could put rigging and erection jobs on a modern business basis and make it pay," he explains.

Inventor—The answer lay in finding streamlined methods of putting up giant presses and machine tools. "We developed a lattice leg A-frame and beam with an overhead traveler to pick up press crowns and move them into position. We also cleaned up after ourselves," he says.

The A-frame, widely used today, cuts press installation time from 60 to 65 days to little more than a week. It can handle 200-ton press crowns. "The savings in time and labor costs were terrific, and the people we worked for liked to walk into the clean plant we left," exclaims Mr. Beveridge.

Mushroomed—Business boomed as companies discovered that streamlined erection pays off. Although it still specializes in press erection, Commercial also installs cranes, conveyors, steel and aluminum rolling mills and heavy equipment for practically all industries.

"Developing experienced field crews has been our biggest problem," reports Mr. Beveridge. Union regulations prohibit using any but local labor on a job location, but a skilled house electrician may not know how to wire a triple action press. Solution: "We train capable field foremen who can follow a job until it's finished."

Background—Mr. Beveridge was born and reared in Sioux Falls, S. Dak., and began his career in the retail tire business in Flint, Mich. He's captain of the Triple C U. S. national championship polo team which will be defending its Open and Twenty Goal titles this month and next.

How To Choose Your Site

ECONOMIC FACTORS

1. Size: Will the new community be unbalanced by your plant? You want to be a neighbor, not a squire. If in the future you have to cut back employment, displaced workers should be able to find other jobs readily
2. How about rail, road and water transportation; utilities, like gas, power and water? Could transportation be a problem in winter?
3. Taxes: Are they fair? You want to pay your share, but not more
4. Safety: How's the community's record on fires, floods and health? Does it have adequate sewer systems and hospitals?
5. Housing: Is there enough at the right price for those employees who will move?
6. How will delivery and shipping costs compare with those at your old location?

POLITICAL FACTORS

1. Is the community alert, progressive, understanding, clean and businesslike? It should compare well on budget balance, debt per capita and reputation for municipal efficiency
2. Does the community have a planning board? If so, it's a good indication of progressiveness. But check. Plans may be either unbalanced or too ambitious. Schools and streets may be too far in advance of growth and requirements

SOCIAL FACTORS

1. How good are the recreational opportunities? Does the suburb offer community activities?
2. Schools: How many, how good, how overcrowded?
3. Acceptance: Is the local paper against industrial expansion?
4. How is the suburb's police, health and cleanliness record?
5. Is the suburb a good place to bring up a family? If employees can feel that their children have a healthful place to grow up in (good schools, safe streets, good health record, good playmates, good moral record), it could be the place for your plant

Planning a Suburban Plant

THE PROBLEMS involved in moving your plant from downtown to a suburb look less intricate than those of a complete location shift. Geographic relationship with markets, raw material and finished product shipping costs will be roughly the same. Your labor market won't change too much.

But your local newspaper tells you that while one of your competitors moved and is flourishing, another made one or more abortive attempts, and now may be operating in what he considers a second-best location.

Ultimate—The ideal way to move is to find a suburb where a suitable piece of ground is already zoned, then to make sure you do a good public relations job before and after the move.

Cyril Bath Co., the Solon, O., maker of radial draw formers and tangent benders, offers an example. The company found a good site on a piece of railroad-owned property 15 miles southeast of Cleveland. It might have moved in, met minimum building requirements and had a satisfactory experience. But it did more.

Do Unto Others—"The golden rule," says Cyril Bath, "is our philosophy. We wanted our plant to enhance, not depreciate, local property values. We spent $50,000 more than the bank thought necessary to get farther from the road, put in attractive landscaping and night lighting."

Results: The plant won enthusiastic local acceptance and national fame. From 600, it was one of 12 companies chosen for making significant contributions to modern industrial design.

Richard Humiston, executive vice president, points out that benefits far outweigh the extra cost. The plant always makes a favorable impression on visitors. The company draws from the pick of local labor, and it lost few of its skilled workers in the move.

How To Goof—Cyril Bath made a careful check of possible sites before it announced its plans. One New York metalworking company didn't. Its president, a leader in local business and civic affairs, expected an enthusiastic response when he announced that he was moving his plant to XYZ township. He was baffled and hurt when his prospective neighbors turned him down cold—and publicly.

His company still had to move. It called in professional help from an engineering company specializing in plant location. Possible sites were checked, three were recommended. The consultant went to the leaders of each community, pointing out benefits that would result from a substantial addition to their tax duplicate. Results: They all competed for the privilege of having the plant. One was the township which had originally turned it down.

On the Spot—Fortunately for the company that must move out to expand, almost all suburbs are badly in need of industry. Most of them realize their problem. Trouble comes because not all groups feel the same way.

Local pressure groups may even fight the entry of such a prime piece of industrial real estate as a research laboratory. In theory, the research lab should cause no problems. It employs high caliber people; it doesn't make smoke. It can be tailored so that it's an architectural asset to any community.

Solution—No company wants to be involved in a civic feud. One midwest control maker, for example, backed hurriedly away from its first-choice site because of pressure. It looked as though it might have similar difficulties with its second-choice location.

Spokesmen convinced local authorities this way: To get the same addition to their tax duplicate, they would have to build 150 houses in the $25,000 class. Instead of being solved, their problems would be compounded. Families have children. More children mean bigger schools. Research labs and other industrial plants pay taxes, but they don't put an added strain on community finances.

Sad Truth—From the company point of view, the ideal suburban site would be zoned, provide room for future expansion, be hooked in with all necessary utilities, have adequate roads, parking space and public transportation. Unhappily, few such sites are close to metropolitan areas.

Realistically, the best that can be expected is a site with potential and a receptive atmosphere which suggests that local authorities will co-operate in translating potential into fact. Most plant location bungles are made either because the group that wants industry doesn't represent the center of power in the community or because the company does an inadequate selling job of the advantages it can bring.

Help Wanted? — The check list on the opposite page gives some of the factors that you should consider in making your preliminary appraisals. You can get help from chambers of commerce, utilities, railroads, industrial realtors and other interested groups. But you may decide that the job requires specialized knowledge and a complete absence of bias.

You can get such an assist from consultants like Austin Co., Cleveland, or Fantus Factory Locating Service, New York. Many management consultants will lend a hand. Point to watch: Plant location is becoming fashionable. Make sure your adviser has the experience needed to do his job. Anyone can pick up the necessary statistics; evaluating them is a different kettle of fish.

Summary—Moving to the suburbs isn't simple. It's the hardest part of a plant relocation. Before you decide on a neighboring suburb, it's common sense to be sure that you are in the best possible general area for your raw materials and markets.

You'll still have the hardest part of the job left. Says one expert: "Choosing the final location is like choosing a wife. You can readily check the physical attributes of a site. It's harder to evaluate intangibles."

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* *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Don't Lose Needed People

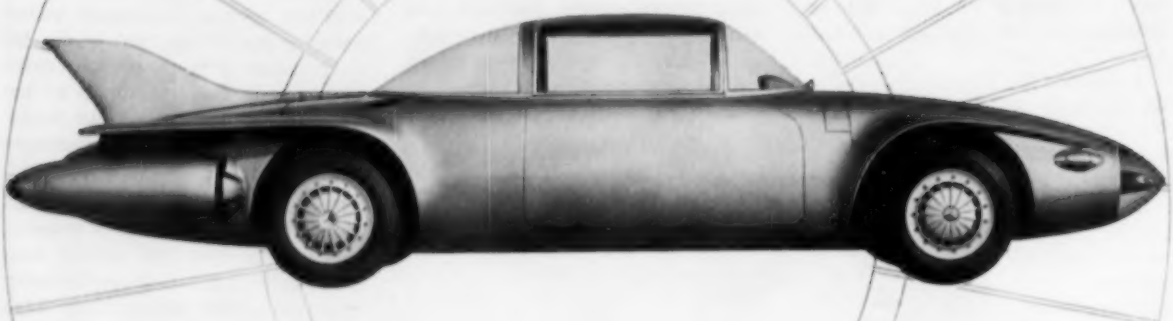
Before S. K. Wellman Co., Cleveland maker of clutch facings and brake linings, moved from its central downtown location to a Bedford site about 15 miles south, one of its first steps was to make an area map showing where its employees lived.

Company officers point out: "We had to make sure that our new location wouldn't cause too much disruption of our workers' travel patterns. It would have been foolish to go 20 miles east, then find that we were losing needed people who had to come from the west side."

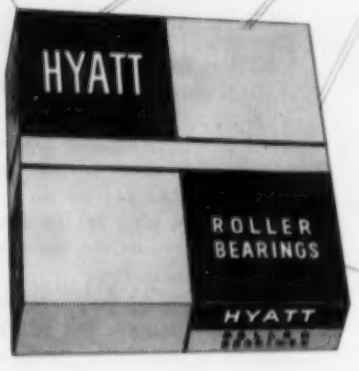
Industrial relations men add that you should make a distinction between hourly paid and supervisory personnel. Aim: To make sure that if you lose anyone because of the move, you don't lose key people. A thorough employee distribution map would also break down job classifications by skills. Few companies can afford to neglect their highly skilled hourly workers either.

Point to remember: Your move to the suburbs may take you into a new labor market. Wellman, for example, is within easy travel time of a large auto complex which is subject to some seasonal layoffs. Result: Its skilled labor resources are in much better shape than they were.

HYATT HELPS FIREBIRD II SAVE FUEL!



Unique regenerator operates in 1300° F exhaust on special HYATT Roller Bearings



To enable the Firebird II to operate almost as economically as a conventional car, GM engineers designed a drum-type regenerator which revolves through the gas turbine exhaust, recovers 80% of its 1300° F heat, and transfers it to the intake air.

No ordinary bearings, however, could handle this job. So HYATT designed special roller bearings which operate efficiently and dependably in this punishing service. Just as dependably as do the millions of HYATT taper bearings which are used in *nearly half the automobiles being built today!*

Remember, HYATT is America's *first* and *foremost* builder of roller bearings—a major source of supply for the automotive industry. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

HYATT ROLLER BEARINGS

STRAIGHT | BARREL | TAPER

This Mercedes 190 SL could appear in Studebaker showrooms as . . .

S-P Opens Under New Management

STUDEBAKER-Packard Corp. avoided a merger and is staying in the automobile game. Curtiss-Wright Corp. is paying bargain rates for needed defense facilities and a big say in the auto company's future.

Tidbits gleaned from the deal indicate S-P may, in effect, become a testing ground for automotive styling, manufacturing and marketing ideas which volume producers shy away from.

Trend—Discussing the terms under which Curtiss-Wright has taken over management of the auto maker, Roy Hurley, C-W president, states: "In the future, Studebaker-Packard will operate in selected, diversified areas of the automotive field." He emphasizes there will be no production races with other auto makers.

Licensing agreements between Curtiss-Wright and Daimler-Benz A. G., Stuttgart, Germany, will give Studebaker-Packard manufacturing rights to the German company's diesel and gasoline engines (complete with fuel injection) as well as other D-B products.

Distributor — Daimler - Benz makes the Mercedes Benz and 190 SL sports cars which sell well in this country. It also turns out the 180-D, a diesel powered passenger car which averages more than 35 miles per gallon on inexpensive diesel fuel.

Mr. Hurley says there are no present plans for distribution of Daimler-Benz automobiles by Studebaker-Packard, but he indicates such an arrangement might be worked out. The German firm will obtain manufacturing rights to C-W and S-P aircraft and automotive products.

Future—Distributing and eventually manufacturing at least one of the D-B lines would be a logical extension of the exchange pact. The diesel job is a good bet since it's more in keeping with Mr. Hurley's announcement that S-P will concentrate on less expensive automotive products and designs.

Sages in the industry still aren't counting out the higher priced Mercedes sports cars. There's a growing market for them, and both firms stand to profit by careful distribution. Unsolved problem:

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What will happen to licensed Mercedes dealers in this country?

Present—Immediate S-P production plans aren't being discussed in the open. Mr. Hurley says he doesn't want to tip off competition. He has stated that all automotive output will be in the company's plants in South Bend, Ind. Packard's Conner avenue (Detroit) assembly plant, leased from Chrysler Corp., will be returned.

It looks like Studebaker will introduce a low priced version of the Hawk and one big model in addition to its truck lines. Packard isn't expected to produce any cars this year. Its assembly line stopped at the end of June. What will happen to 1650 Packard dealers during this lapse isn't clear.

Conjecture — Presumably, the company will ready a '58 model closely resembling the experimental Packard Predictor, but loss of '57 output would be fatal to dealers. A face-lifted '56 still can be put into production late this fall, according to Mr. Hurley's comments. It would have the Predictor's nose and tail fins.

A Packard executive says he understands there will be no '57 models, but admits no firm decision has been made. Other sources suggest some type of factory distribution and marketing will fit better into Mr. Hurley's scheme for the auto company.

Review—Officials of both companies emphasize that all problems aren't resolved. One point is clear: Studebaker-Packard still is in the auto business on a reduced scale. These are the terms which give management reins to Curtiss-Wright:

1. The aircraft firm will pay $35 million for 12-year leases on Studebaker-Packard's Utica (Mich.) engine plant and the Chippewa (South Bend) assembly plant. The price includes outright purchase of the Aerophysics Development Corp., Santa Barbara, Calif. (S-P subsidiary), and other defense inventories. All three plants will be operated as wholly owned subsidiaries.

2. Curtiss-Wright plans to put defense contracts worth about $200 million annually into the leased facilities. First step is a $16.5 million Navy order for Dart missiles and equipment which will be built at Utica. A $36-million contract for Army trucks will be filled at the Chippewa plant. Both awards went to Utica-Bend Corp., the Curtiss-Wright subsidiary which will manage the leased plants.

3. The auto company will operate as a separate entity with its own directors and officers, but under a managerial contract which runs for three years. All operations will be at South Bend. Harold Churchill, former Studebaker vice president, has been named president. James J. Nance, former president, has stepped down to a temporary advisory post.

4. Curtiss-Wright gets (subject to stockholder approval) a two-year option to buy 5 million shares of unissued S-P common stock at $5 a share. This can give it working control of the company.

Finances—Mr. Hurley reports Curtiss-Wright's first half statement shows earnings equal to $2.76 a share on net sales of $279 million. Last year, net income was $2.02 a share on sales of $250 million. Unfilled orders total $657 million. Defense contracts account for about 50 per cent of company profits, he adds.

Studebaker-Packard has lost money ever since the two companies merged in 1954. It owes $29.7 million out of a $45-million credit line. The $35 million in working capital it gets from Curtiss-Wright will entitle it to an additional $15 million worth of credit.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804†	659,763
7 Mo. Total	3,641,291†	4,916,917
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
July 14	112,361	167,473
July 21	113,416	196,434
July 28	111,247	161,370
Aug. 4	111,152	140,788
Aug. 11	109,108†	149,199
Aug. 18	107,000*	138,209

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

AMC Starts Family

A family of lightweight, air cooled engines is being developed by American Motors Corp. One of them, a 62-hp V-4 unit, weighs only 200 lb.

Power plants are built around a die-cast aluminum crankcase. Individual cylinders, also die-cast aluminum with chrome-plated bores, are assembled in groups of two or more to give desired horsepower. As many as eight cylinders can be added to the engine.

Each cylinder delivers up to 15 hp. Cylinder heads, covers and timing gear housings can be die cast. The engines may be assembled as V-type or straight line models.

The V-4 engine, already tested in a light military vehicle, has a displacement of 108 cu in. and a compression ratio of 7.5 to 1. It sports a valve-in-head arrangement. Dimensions are about 2 x 2 x 2 ft.

AMC hasn't said the engines will be used in automobiles, but at least one of the group looks like a good bet for the Metropolitan. Many parts are interchangeable.

Exhaust Notes

- Cadillac has bought the old Hudson body plant (Detroit). Metal fabrication operations employing 1500 will start by fall, 1957.
- Rumors have it that all Chrysler Corp. cars will have torsion ride suspension next year. Some trouble has been experienced in beefing up frames to prevent twisting under torsion bar strains.
- Ford Motor Co. is building an automotive wind tunnel in Dearborn, Mich. It will produce air speeds up to 125 mph. Temperatures can be adjusted from zero to 150°F.

FACTS

about

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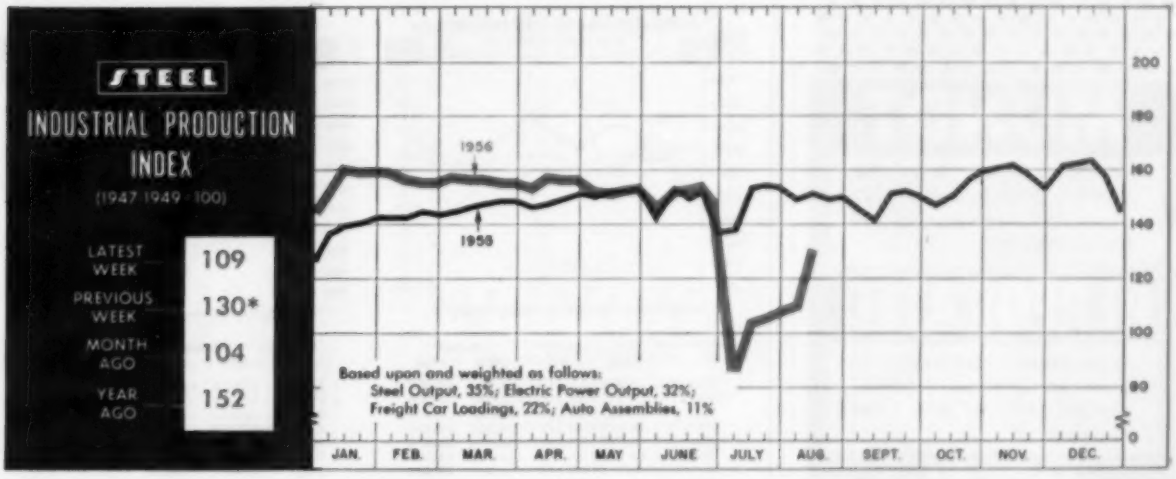
DM-2	2½% Cr.-1% Mo.	Sicromo 7	25-12
Silmo	Sicromo 3	Sicromo 9M	35-15*
DM	4-6% Cr.-Mo.	18-8 Stainless	16-25-6*
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti	18-8 Cb	

*Not available as seamless tubing at the present time.

General view of the Timken Company metallographic laboratory where many analyses of steels are viewed under high-power microscopes.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Aug. 11

Rising Backlogs Point to Better Business

UNFILLED ORDERS in the durable goods industries give a clue to business conditions for the rest of the year and at least part way into 1957: They are still climbing at a rate reminiscent of the business build-up in the latter half of 1955.

This doesn't necessarily mean that the next few months will be record breakers, but conditions are favorable for metalworking to pull out the stops once raw materials start moving in a more normal manner. Going into the steel strike, Department of Commerce figures show that durable goods producers had a backlog of about $55.5 billion—up $1 billion from May's as new orders continued to run ahead of production (see chart, page 92). Even though the new orders showed a slight dip in June—probably because of the uncertainty before the steel strike—there has been no indication that this is a trend. In fact, many metalworking companies reporting at midyear feel that orders for the last half will be ahead of the first half totals.

Meaning—This will push backlogs even higher, because sales (synonymous with production in the government's figures) cannot rise faster than producers have raw materials with which to produce. The main holdback will be steel, which will not be flowing at the prestrike rate for another month or two.

The increase in backlogs is nearly across the board in metalworking. Starting with the steel mills, many of which report solid bookings through the fourth quarter, the question is one of maintaining production to meet delivery schedules. As of July 1, American Machine & Foundry Co. had a backlog of $88.3 million, over $9 million ahead of the July 1, 1955, total; Boeing Airplane Co. had $2.6 billion, compared with $2.5 billion at the end of first quarter. Lockheed Aircraft Corp.'s backlog is double its figure of a year ago. Jack & Heintz Inc. has nine months' pro-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,106[1]	1,415	2,176
Electric Power Distributed (million kw-hr)	11,400[1]	11,190	10,729
Bituminous Coal Output (1000 tons)	9,235[1]	9,030	9,099
Petroleum Production (daily avg—1000 bbl)	7,050[1]	7,065	6,621
Construction Volume (*ENR*—millions)	$322.8	$309.5	$334.5
Auto, Truck Output, U. S., Canada (*Ward's*)	134,612[1]	140,989	175,815
TRADE			
Freight Car Loadings (1000 cars)	690[1]	660	775
Business Failures (Dun & Bradstreet)	282	274	213
Currency in Circulation (millions)[3]	$30,715	$30,575	$30,285
Dept. Store Sales (changes from year ago)[3]	+7%	−1%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,516	$20,619	$18,094
Federal Gross Debt (billions)	$272.5	$272.6	$277.1
Bond Volume, NYSE (millions)	$17.2	$20.4	$15.2
Stocks Sales, NYSE (thousands of shares)	11,540	11,657	8,694
Loans and Investments (billions)[4]	$84.6	$84.5	$84.9
U. S. Govt. Obligations Held (billions)[4]	$26.0	$26.0	$31.1
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	210.45	207.63
STEEL's Nonferrous Metal Price Index[6]	261.7	261.1	241.1
All Commodities[7]	114.2	114.2	110.1
Commodities Other Than Farm & Foods[7]	121.8	121.5	116.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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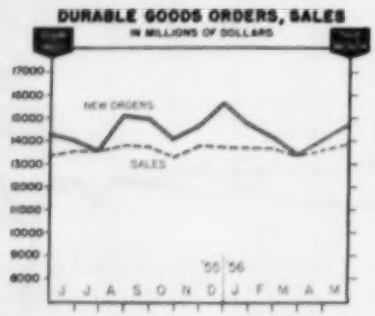

	New Orders* 1956	New Orders* 1955	Sales* 1956	Sales* 1955
Jan.	14,683	12,142	13,595	11,850
Feb.	14,107	12,170	13,593	12,029
Mar.	13,337	13,383	13,294	12,860
Apr.	14,073	12,879	13,519	12,805
May	14,732	14,331	13,754	13,322
June	14,365†	14,033	13,879†	13,527
July	.....	13,571	.....	13,503
Aug.	.....	15,145	.....	13,745
Sept.	.....	14,936	.....	13,692
Oct.	.....	14,094	.....	13,261
Nov.	.....	14,680	.....	13,721
Dec.	.....	15,605	.....	13,688

*Seasonally adjusted. †Preliminary
U. S. Office of Business Economics

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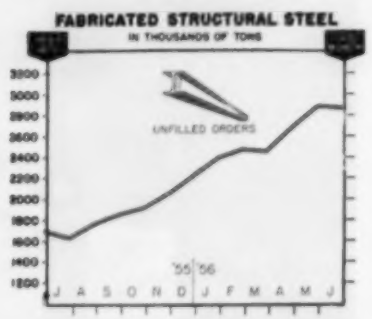


	Shipments 1956	Shipments 1955	Backlog 1956	Backlog 1955
Jan.	251.5	225.8	2,406	1,3[illegible]
Feb.	285.4	213.4	2,476	1,3[illegible]
Mar.	306.8	227.8	2,463	1,3[illegible]
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,5[illegible]
June	284.7	282.3	2,859	1,708
July	....	219.4	....	1,6[illegible]
Aug.	....	268.0	....	1,7[illegible]
Sept.	....	289.1	....	1,8[illegible]
Oct.	....	283.8	....	1,928
Nov.	....	258.9	....	2,0[illegible]
Dec.	....	248.0	....	2,243
Total	....	2,979.4		

American Institute of Steel Construction

duction on the books. Baldwin-Lima-Hamilton Corp.'s unfilled orders stand at $102.3 million, compared with $96.2 million last year. Walter Kidde & Co. Inc. has a backlog of $18.2 million, compared with $13.6 million on Jan. 1.

General Agreement—Those are not isolated cases. Fabricated structural steel producers have near record backlogs (see chart above). Machine tool builders and railroad car builders have enough business to carry them well into 1957 without any worries.

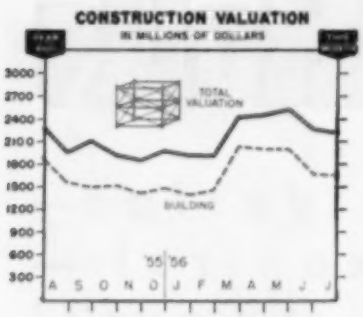
For a time, at least, this situation will result in a further sidewise, or perhaps downward, movement in inventories held by durable goods manufacturers. The leveling off noted during June was in large part accounted for by the auto industry as it pared stocks at the dealer level. But other segments of metalworking helped. In June the industry took less than 100,000 tons of steel into inventory, compared with about 856,000 tons the month before.

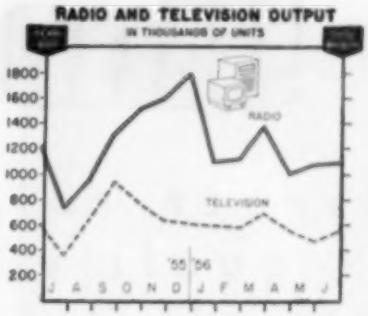
Tide Turns for Tractors

One of the few weak segments of the industry is the farm implement market. During the last three months, International Harvester Co. has laid off over 5200 workers because of slack sales. Caterpillar Tractor Co. cut production at three plants, blaming the action on a steel shortage. While sales will be off this year, there is an undercurrent in the industry that the turn has come (see page 78). The rest of the year should see better production.

Auto Makers Breathe Sigh

Most of the auto industry's current troubles are over. Even though production and sales are not up to last year's standards, the condition at this time is described as seasonal — model change-over time is upon us. All producers except General Motors began slowing up by the middle of the month, resulting in a 3 per cent reduction in production for the week ended Aug. 11, says *Ward's Automotive Reports*. Except for the bleak production period from now until late September—which is normal—there is nothing ahead but good news for motordom. L. L. Colbert, president of Chrysler Corp., feels that economic conditions of the auto





	Total		Building	
	1956	1955	1956	1955
Jan.	1,858.2	1,504.5	1,355.7	1,255.1
Feb.	1,859.7	1,581.1	1,429.3	1,278.6
Mar.	2,382.0	2,134.8	1,986.5	1,748.6
Apr.	2,421.5	2,322.1	1,965.6	1,776.1
May	2,479.8	2,185.1	1,948.7	1,737.1
June	2,197.8	2,255.2	1,620.5	1,793.7
July	2,148.6	2,271.5	1,605.3	1,851.6
Aug.	.....	1,894.8	.....	1,516.9
Sept.	.....	2,034.9	.....	1,442.2
Oct.	.....	1,862.7	.....	1,474.8
Nov.	.....	1,796.8	.....	1,388.3
Dec.	.....	1,920.8	.....	1,438.0
Totals	.....	23,764.3	.....	18,701.0

F. W. Dodge Corp.

	Radio		Television	
	1956	1955	1956	1955
Jan.	1,079	1,068	588	655
Feb.	1,094	1,090	576	703
Mar.	1,360	1,482	680	831
Apr.	993	1,100	550	583
May	1,060	1,114	468	467
June	1,073	1,205	553	590
July	....	718	...	344
Aug.	....	948	...	648
Sept.	....	1,302	...	940
Oct.	....	1,500	...	760
Nov.	....	1,581	...	632
Dec.	....	1,786	...	605
Totals ...	....	14,895	...	7,757

Radio-Electronics-Television Mfrs. Assn.

industry in 1957 will be as good as or better than they were in 1955, the record production year.

Index Registers 130

For the rest of the third quarter, the auto industry will have a dampening effect on the recovery of STEEL's industrial production index. For the week ended Aug. 11, the index registered a preliminary 130 (1947-1949=100), up from 109 the week before. It will rise about 15 points in the week ended Aug. 18 on the strength of improved steel operations, then level off until the fourth quarter, when all segments of the index approach seasonal peaks.

Construction Record Seen

Most signs continue to point to a record in construction this year. The one note of caution: A serious slowdown of heavy construction could develop if steel supplies become too tight. The Commerce and Labor departments report that construction outlays hit a new high for July at $4.2 billion. For the first seven months, spending for construction put in place is a record $24.1 billion.

Other statistics on construction are almost as convincing. F. W. Dodge Corp. says contract awards for future construction in the 37 eastern states are 8 per cent ahead of those in the corresponding period of last year. *Engineering News-Record,* which uses a different statistical technique, puts awards ahead of last year's period by a whopping 19 per cent.

Employment Holds Gains

The government's employment statistics for July are clouded by the steel strike, but even so they point to one of the greatest strengths in our economy this year: Employment is higher than ever before. July figures for nonfarm employment show a rise of 1 million over the year-ago month. Practically all the decline between June and July—reported by the Bureau of Labor Statistics as 700,000—can be accounted for by the strike. For the first time in six years, the work week did not decline between June and July, holding steady at 40.1 hours. This is strong evidence that industrial production is continuing at a high rate in what was earlier regarded as this year's "off" quarter.

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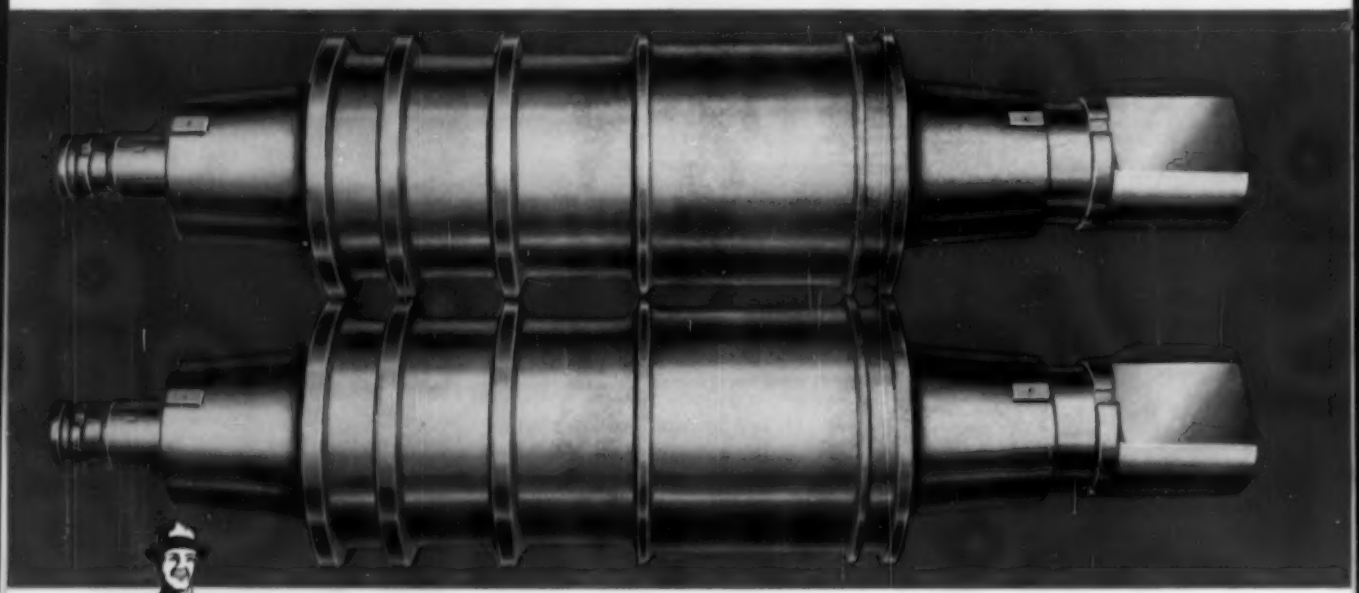

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Cambridge Wire Cloth Co., Cambridge, Md., appointed **Everett P. Creighton Jr.** plant manager and **Clifford R. Pink** superintendent of the wire cloth and fabrication department.

V. H. Peterson was named vice president - engineering, **Fairbanks, Morse & Co.**, Chicago, to succeed **J. F. Weiffenbach**, resigned. Mr. Peterson was vice president-railroad sales.

William J. Grede was elected chairman of the executive committee of **J. I. Case Co.**, Racine, Wis. He is president of Grede Foundries Inc.

Robert K. Johnson was made sales manager for electronic components manufactured by the **Borg Equipment Division** of George W. Borg Corp., Janesville, Wis. He succeeds **N. W. Alexander** who left to form Redford Corp. and will act as the division's factory representative in New York State.

Howard E. Blood Jr., former manufacturing manager of the Detroit Gear plant of **Long Mfg. Division**, Borg-Warner Corp., was made administrative assistant to the division president. He is succeeded at the Detroit Gear plant by **W. E. Rowe**, manufacturing manager of Long, who assumes manufacturing responsibility in all plants of the division.

GEORGE E. BRUMBACH
. . . Carpenter Steel chief metallurgist

George E. Brumbach was appointed chief metallurgist, **Carpenter Steel Co.**, Reading, Pa. He was metallurgist. **Richard P. Evans** was named assistant to the vice president-sales, responsible for executive contacts, with headquarters in New York. **Robert P. Uhl**, branch manager of the Dayton, O., warehouse, succeeds Mr. Evans as New York district manager. **Charles E. Miller** becomes branch manager of the Houston area, and **O. T. Thompson** of the Detroit area.

Herbert F. Byrne was appointed vice president-production planning and **Louis J. Rohl** vice president and chief metallurgical engineer of **United States Steel Corp.**, Pittsburgh. Both are new positions. **Joseph M. Greer** was made general manager-production planning.

Paul V. Brown was made manager of the industrial rolls division of **Sam'l Bingham's Son Mfg. Co.**, Chicago.

Kaiser Aluminum & Chemical Corp. appointed **Morris W. Porter** sales manager of its new Foil Kraft Division. He is in Chicago.

Jeffrey Mfg. Co., Columbus, O., promoted **Russell W. Knode** to manager of field offices, mining division. He was export manager, and is succeeded by **John R. Jeffrey.**

C. K. OLSON JR.
. . . Yates-American Machine v. p.

C. K. Olson Jr. was elected vice president and director of sales for all products manufactured by **Yates-American Machine Co.**, Beloit, Wis. For the last two years he was co-ordinator of sales for the Head & Knife and Lipman Refrigeration Divisions, as well as the J-Line, power tool and heavy woodworking divisions.

Robert B. Heppenstall Jr., general manager of the Bridgeport, Conn., plant of **Heppenstall Co.**, was made general manager of the company's Ring Division with headquarters at the Indianapolis plant. He will direct both the manufacture and sales of rolled and hand-forged rings. **Charles B. Cobun** was made manager of ring sales at the Indianapolis plant to succeed **Charles A. Shenberger**, resigned.

Wayne O. Stoughton was made sales manager, **Pittsburgh Steel Products Division**, Pittsburgh Steel Co., Pittsburgh. He succeeds **Robert L. Glose** who will serve as sales adviser until his retirement on Dec. 31. **Thomas L. Griffith** becomes assistant sales manager and is succeeded by **Robert K. Lohman** as manager of material handling sales in the division.

J. E. Harling was made operations manager in charge of manufacturing and purchasing for both the Pasadena, Calif., and Los Angeles facilities of **Air Logistics**

H. H. KIECKHEFER
. . . Wheelco Instruments sales mgr.

JAMES C. BORGER
. . . heads Bowman Chemicals

KING D. CHRISTOPHER
. . . Clark Controller L. A. gen. mgr.

Corp. He was president and general manager, Wire Co. of America.

H. H. Kieckhefer was made sales manager, **Wheelco Instruments Division,** Barber-Colman Co., Rockford, Ill. He was assistant sales manager.

Walter Poremba was made assistant sales manager, **Alloy Precision Castings Co.,** Cleveland.

Lawrence T. Peifer was appointed administrative vice president, **Atkins Saw Division,** Borg-Warner Corp., Indianapolis.

Michael Stasko, supervisor of quality control for **Cleveland Cap Screw Co.,** Cleveland, was appointed assistant to the product engineer. **Andrew V. Wetzel** was named chief metallurgist for the company's two plants.

Joseph Dodson fills the new post of director of company-owned operations for **Culligan Inc.,** Northbrook, Ill.

Luria Bros. & Co. Inc. appointed **Francis I. Kilcline** district manager of its Kokomo, Ind., office; and **Jack D. Langer** of its Memphis, Tenn., office.

Wallace I. Marsteller was made superintendent of open hearth bloom and billet mills at **Republic Steel Corp.'s** Youngstown district steel plant. He replaces **J. C. Edie,** retired.

James C. Borger was made president and manager of **Bowman Chemicals Inc.** On Sept. 1, the firm will be associated with Metal Improvement Co., Los Angeles. Mr. Borger was production method engineer at Lockheed Aircraft Corp. Besides managing operations of Bowman Chemicals, he will assist Metal Improvement on special peening problems and in the design of shot peening equipment.

M. Everett Barnard was made manager of **Carrier Corp.'s** unit heater department, Syracuse, N. Y. He was sales manager.

D. C. Stephens was promoted from machine shop superintendent to production manager by **Goslin-Birmingham Mfg. Co.,** Birmingham. He is succeeded by **Carter E. Putnam.**

Cecil Barlow was named manufacturing superintendent and **Melvin Schoenberg** planning supervisor at **Greer Hydraulics Inc.,** Jamaica, N. Y.

John A. Plunkett was made assistant plant manager, **Titanium Alloy Mfg. Division,** National Lead Co., Niagara Falls, N. Y.

Carl L. Bausch was elected chairman of **Bausch & Lomb Optical Co.,** Rochester, N. Y. He succeeds the late **Joseph F. Taylor.**

R. J. Morgan was elected president and chairman, **England Electric & Mfg. Co.,** La Jolla, Calif.

King D. Christopher was named general manager of **Clark Controller Co.'s** new Los Angeles division, which includes engineering and manufacturing departments as well as handling sales in the area.

Fred T. Chalmers was made an assistant manager of **Republic Steel Corp.'s** Alloy Steel Sales Division, Massillon, O. He was a vice president for Mid-West Forge Co.

Wier A. Kellogg, former eastern district manager, **National Engineering Co.,** Chicago, was elected a vice president.

James L. Hamilton Jr. was made western sales manager, **Mead-Morrison Division,** McKiernan-Terry Corp., with headquarters in the Chicago office. He succeeds **S. F. Knight,** retired.

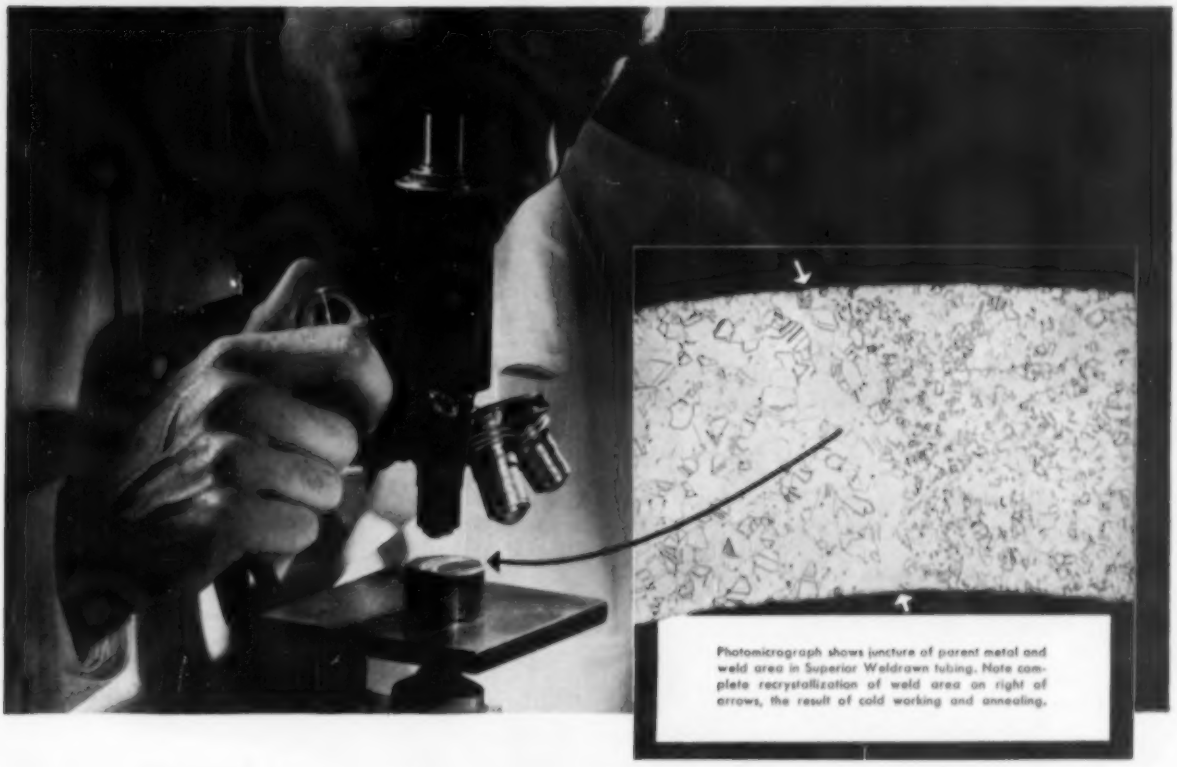
B. B. Flick, former lubrication engineer for **E. F. Houghton & Co.'s** Detroit division, was transferred to the Pittsburgh Steel Mill Division in charge of sales and service.

Charles E. Humer was made staff assistant to the general manager and **Alan J. Dodd,** director of purchases for the Utica, N. Y., division of **Bendix Aviation Corp.**

William S. Howe was named sales manager for domestic and foreign operations of **Koenig Iron Works Inc.,** Houston.

James B. Rafter was named special assistant to the manager of

Weldrawn® Tubing *by* Superior



Photomicrograph shows juncture of parent metal and weld area in Superior Weldrawn tubing. Note complete recrystallization of weld area on right of arrows, the result of cold working and annealing.

So perfect the bead actually vanishes!

Here's how to cut tubing costs up to 50%

Specify Superior Weldrawn. You get quality approaching that of seamless, at savings as high as 50%! Unlike other welded tubing, Weldrawn is offered in *any* of the intermediate sizes—made possible because of the redrawing after welding.

"Weldrawn" Means—

This is a tubing far superior to ordinary welded tubing for many applications requiring forming, machining and corrosion resistance. After welding, it undergoes alternate cold drawing and annealing.

The weld area recrystallizes (see photo above), acquiring mechanical properties equivalent to those of the parent metal. The bead actually vanishes!

Costs Are Low

Weldrawn tubing is produced in 18 different analyses, in a wide variety of sizes. Cost savings are 10 to 20%. In certain materials you save up to 50%!

Quality Is High

In Weldrawn you get tubing with highly uniform mechanical properties throughout, and clean, smooth, bright ID and OD surfaces. Because no filler or flux is used during welding, the corrosion resistance of the weld area is equal to that of the parent metal. And by repeated redrawing and annealing after welding, any possible faults or defects in the weld are eliminated.

Specify Superior

In addition to Weldrawn tubing, we also offer a wide variety of analyses and sizes in Seamless grade. So for the finest in small tubing, always specify Superior.

Whatever your problems in small tubing, Superior can help you. For additional information on Weldrawn, write for Data Memorandum No. 2. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses available in .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

JOSEPH A. OEMING
. . . Wickes Machine Tool sales mgr.

SIDNEY A. MATTHEWS
. . . heads SPS machine tool purchases

the sales division of **Armco Steel Corp.** He is in Baltimore.

Joseph A. Oeming was made sales manager, **Wickes Machine Tool Division,** Wickes Corp., Saginaw, Mich. He is succeeded as Detroit district manager of the division by **R. T. Loudon.**

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., named **Russell E. Hoehl** assistant eastern sales manager and **Alfred A. Binkerd** district sales manager, Philadelphia territory.

Crucible Steel Co. appointed **Walter Slinger** and **Benjamin F. Doty** as welding engineers with headquarters in Harrison, N. J.

William F. Styer was named Milwaukee district sales manager for **DeWalt Inc.**

B. R. Stratton was made Atlanta district sales manager for **Cutler-Hammer Inc.**

Standard Pressed Steel Co., Jenkintown, Pa., appointed **Sidney A. Matthews** to serve as machine tool analyst. He will evaluate, recommend and co-ordinate the purchase, delivery and installation of all new machine tools purchased by the firm.

H. Douglas Lowrey was made director of manufacturing and **Clifford R. Carson** industrial engineer for **Chrysler Corp.'s** Defense Operations Division, Detroit.

Inland Steel Co., Chicago, appointed **Derrick L. Brewster** assistant general sales manager. He is succeeded by **John Strome** as manager of the Chicago district sales office. **W. P. Goodman** becomes assistant manager. **John G. Mack Jr.** was made assistant manager, bar and semifinished steel division, sales department.

Chrysler Corp., Detroit, appointed **Leroy B. Bornhauser** general manager, axle and transmission division; **Arnold W. Hartig,** a member of basic manufacturing staff; and **Arthur M. Swigert,** plant manager, Detroit Universal Division. **James C. Zeder,** vice president-engineering, was made special adviser to the president; **Paul C. Ackerman,** director of engineering, was elected a corporation vice president.

Seth H. Stoner was made chief engineer and **F. J. Garbarino,** director of quality control for **New Departure Division,** General Motors Corp., Bristol, Conn.

James P. O'Connor Jr. was made sales manager, **Industrial Plastic Fabricators Inc.,** Norwood, Mass.

H. T. Doughty was made chief engineer, transportation products department, **Stran-Steel Corp.,** Ecorse, Mich.

Domenic A. DiTirro was made manager of research and development of **Valvair Corp.,** Akron. He formerly served in a similar position with Ross Operating Valve Co.

Edward J. Eggart was elected president of **Vinco Corp.,** Detroit. He succeeds **E. E. Butler,** now chairman.

John E. Shreve was elected vice president-sales for **J. A. Zurn Mfg. Division** of the recently formed Zurn Industries Inc., Erie, Pa.

B. T. Wasdyke was named superintendent of experimental engineering at the Utica, N. Y., division of **Bendix Aviation Corp.**

William Willis was made engineering manager of **Marman Products Co. Inc.,** Los Angeles, a subsidiary of Aeroquip Corp.

OBITUARIES . . .

Harry C. Boardman, 69, director of research, **Chicago Bridge & Iron Co.,** Chicago, died Aug. 6.

Sol S. Fox, 52, founder and president, **Universal Sheet & Strip Steel Co.,** Chicago, died Aug. 5.

Frederick G. Morley, 77, chairman of **Great Lakes Engineering Works,** River Rouge, Mich., died Aug. 5.

William F. McNally, sales manager, **Pittsburgh Tube Co.,** Pittsburgh, died July 27.

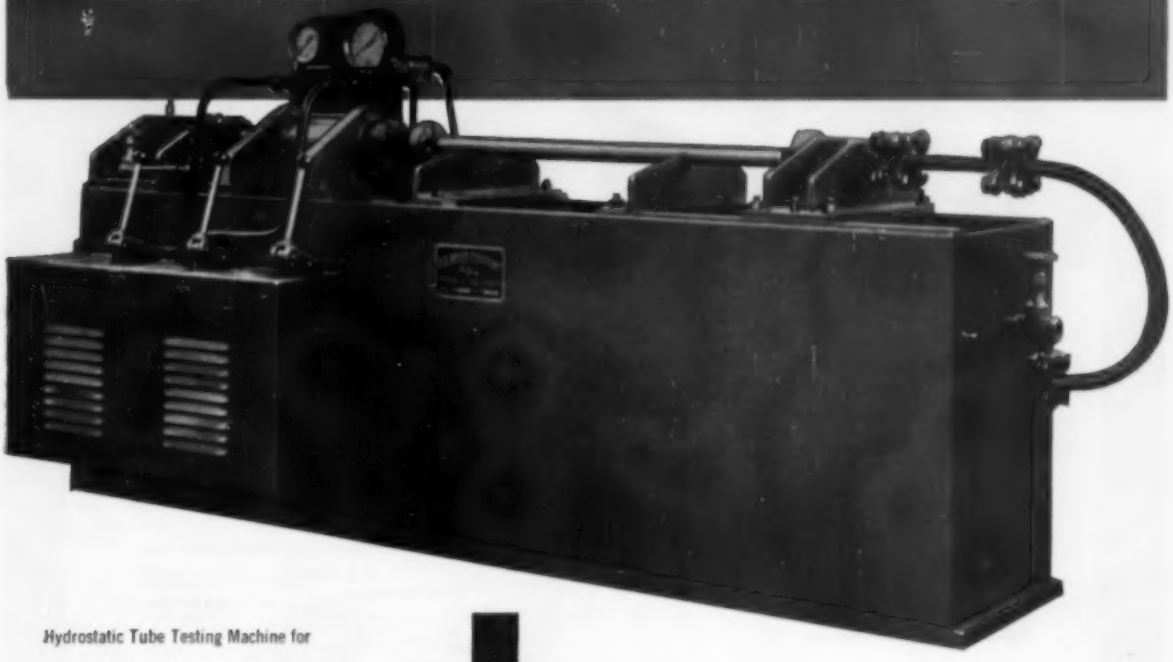
Thomas Cohen, 83, president, **Cohen & Son Scrap Metal Co.,** Troy, N. Y., died Aug. 2.

Daniel W. Tomlinson III, 73, chairman of **Batavia Metal Products Inc.,** Rochester, N. Y., died July 30.

Dent W. Sanford, 65, vice president, **Goodyear Tire & Rubber Co. of California,** died Aug. 6.

Arthur F. Schmidt, director of purchasing, **Lunkenheimer Co.,** Cincinnati, died July 24; **Harry A. Fox,** buyer for the purchasing division, died July 25.

when you can't afford to be wrong...



Hydrostatic Tube Testing Machine for testing 3'-0" to 5'-0" lengths of tubing up to 2¼" O. D. under pressures ranging up to 6,000 psi. Used specifically for automotive propeller shaft tubing, but has many other uses. Average production rate is 250 tubes per hour. This is only one of many pieces of hydraulic equipment made by R. D. Wood for the automotive and aircraft industries.

...Choose your machine from the line that has been industry's standard since 1803. In more than 150 years, R. D. Wood has never built an inferior piece of equipment. Every R. D. Wood product is the result of minute attention to details of design, excellent materials, painstaking craftsmanship. Users of R. D. Wood equipment—throughout industry—translate these features into over-all efficiency, operating speed and ease, and production economies. Write for engineering information—without obligation—on R. D. Wood presses for the automotive and aircraft industries.

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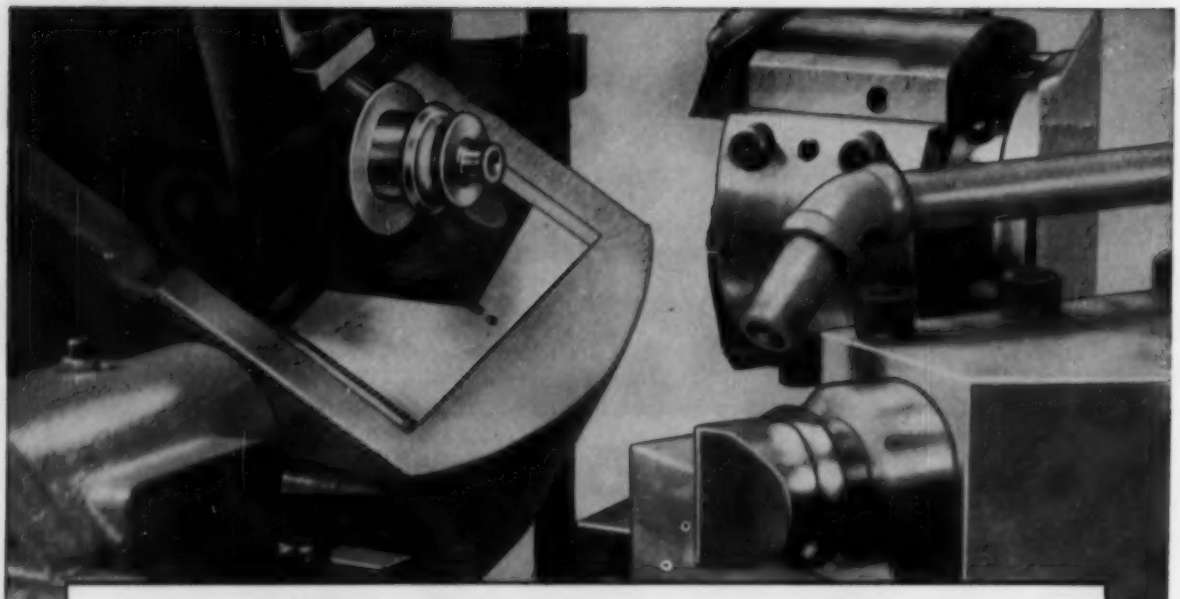


From PROBLEM to PROFIT

in just 3.59 minutes . . . with a

POTTER & JOHNSTON 6DRE-40

Automatic Chucking Turret Lathe

HERE ARE THE FACTS

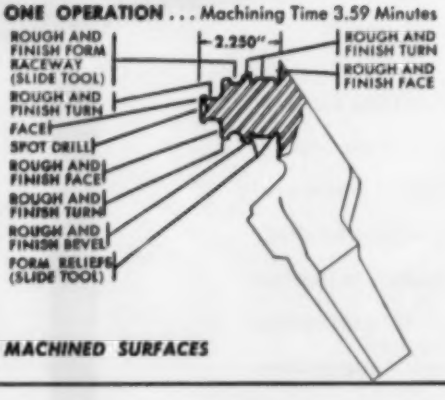
PART: Cutter Bit Arm

MATERIAL: 4812 Steel Forging

REQUIRED: 18 separate, precision cuts . . . including some "fussy" single point form turning.

COMPLETED: Quickly, economically in 1 completely automatic cycle!

ONE OPERATION . . . Machining Time 3.59 Minutes



HEAVY LINES INDICATE MACHINED SURFACES

And remember, this is *not* an exceptional, "done-for-the-record" case history. It's a regular production job that typifies the day-in-day-out performance you can count on because a P&J 6DRE-40 has the advanced design, added rigidity, extra speed and power, and versatility to take tough jobs in stride. And when you team this P&J Automatic with tooling engineered by P&J Specialists, you really have a cost cutting, profit building combination.

SEND NOW FOR COMPLETE INFORMATION

Write today for your free copy of Bulletin No. 159 describing the P&J 6DRE-40 in detail. Complete engineering data is included.

Precision Production Tooling for more than Fifty Years

POTTER & JOHNSTON COMPANY

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

McKay Buys Firm

Metal Processing Machine Co. will be operated as separate division of equipment maker

McKAY MACHINE Co., Youngstown, acquired Metal Processing Machine Co., Youngstown. McKay is a designer and builder of tube and pipe mills, automated lines for cold drawing and processing of hot-rolled bars, roller levelers and related equipment for the steel, nonferrous metal, automotive and other industries.

Products—Metal Processing specializes in shear-welders for joining steel and nonferrous strip, continuous tube mill feeders and loopers, payoff reels, tension reels, sheet pilers, pinch roll units, coil lifts and transfers and automated tube and pipe handling equipment.

It will operate as a separate company but will tie in with McKay on sales, sales service and engineering. R. T. Klempay, formerly president of Metal Processing, has been appointed vice president and general manager. Mr. Klempay organized the company in 1952. From 1944 to 1952 he was vice president of Arms-Franklin Corp., Youngstown.

Before World War II, McKay was principally a builder of equipment for the steel industry. Now over 50 per cent of its business is in industries such as automotive and aircraft, reports A. J. Wardle Jr., president.

Armco's Ingot Capacity Rising

Armco Steel Corp. announced plans for a 9 per cent expansion in steel ingot capacity at its Middletown (O.) Works. An additional open-hearth furnace will be completed by mid-1957; the 300-ton furnace will cost about $2 million. This is part of Armco's overall program that will increase annual steel production capacity to 6.2 million tons by early 1958.

Starts Pipe Mill Construction

Welland Tubes Ltd. expects to start operation late this year in its pipe mill which is being constructed at Welland, Ont. The mill will supply a major portion of 30-in. pipe for Trans Canada Pipe Lines Ltd.'s 2200-mile natural gas pipeline. The mill, a joint venture of Page-Hersey Tubes Ltd. and Steel Co. of Canada, will produce steel pipe from 20 to 36 in. in diameter.

AMF Assigned Ballistic Work

American Machine & Foundry Co., New York, will develop and manufacture accessory power supplies for the Air Force intercontinental ballistic missile program. Operations will be conducted at the company's Turbo Division, Pacoima, Calif.

Enlarges Titanium Facilities

Stauffer Chemical Co., Niagara Falls, N. Y., is expanding its titanium tetrachloride production facilities. The program, scheduled for completion in early 1957, will quadruple plant's 1955 capacity.

Expands Steel Strapping Plant

Stanley Works, New Britain, Conn., is building facilities which will double steel strapping production. The new plant will make centralization of operations possible. The firm will produce close to 300,000 miles of steel strapping at New Britain this year.

Inaugurates Barge Service

Ohio Ferro-Alloys Corp., Canton, O., now offers barge service from its Brilliant, O., plant. A barge dock which cost $40,000 has been completed on the Ohio river adjacent to the plant. This is part of an expansion program which included the installation of a 15,000-kva electric furnace. An extension is being added to the main furnace building.

Forms Nuclear Fuel Division

Olin Mathieson Chemical Corp., New York, formed a Nuclear Fuel Division to produce nuclear fuel elements and nuclear reactor cores. M. F. Meissner, vice president, is in charge of the division. He also heads the firm's Metals Division. Equipment is being installed in temporary quarters at the Winchester arms plant in New Haven,

(*Please turn to page* 104)

SIMONDS

INDUSTRIAL CUT GEARS

LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

QUALITY GEARS FOR OVER 60 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS WORM GEARS
RACKS PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings and industrial V-belts.

SIMONDS GEARS

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA

BLAW-KNOX

makes what it takes

to hot roll high-tonnage

top quality sheet

This CONTINENTAL 80-inch, 6-stand continuous hot strip mill in the United States Steel's Gary Sheet and Tin Mill was designed and engineered for heavy duty and high-speed finishing. It is well-known throughout the industry for excellent tonnage performance and quality.

In addition to these large mills, Blaw-Knox builds single-stand reversing hot strip finishing mills, complete with all auxiliaries.

Blaw-Knox designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry & Mill Machinery Division
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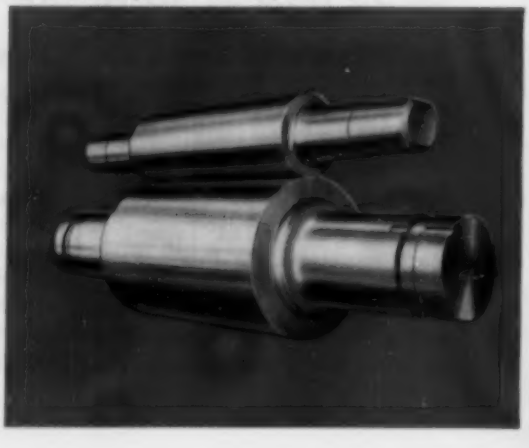
Complete rolling mill installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills . . . roll lathes • chippers • special machinery • and complete auxiliary equipment

50th Anniversary
BLAW-KNOX
1906-1956

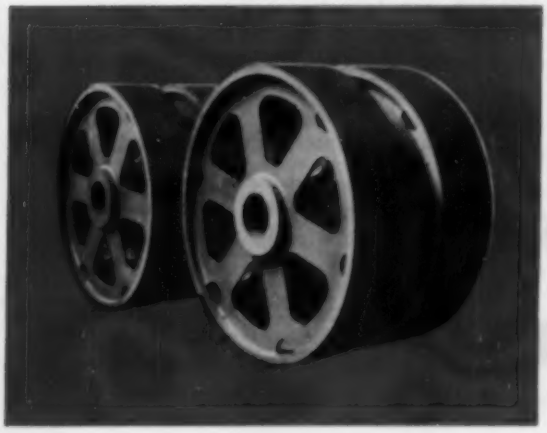
CONTINENTAL

ROLLS—Iron, alloy iron and steel rolls for all types of rolling mills.



CONTINENTAL 80-inch continuous hot strip mill in the Gary Sheet and Tin Mill of the United States Steel Corporation.

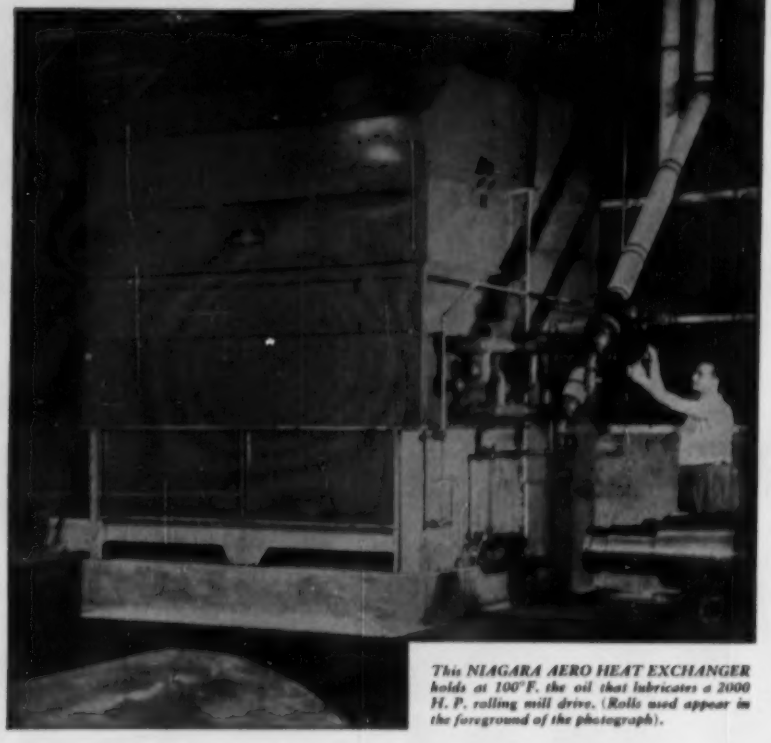
WELDMENTS—fabricated steel plate, or cast-weld design.



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

You save money and trouble when you keep

ACCURATE CONTROL OF LIQUID TEMPERATURES



This NIAGARA AERO HEAT EXCHANGER holds at 100°F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

(Concluded from page 101)

Conn. A larger facility will be in operation within 18 months.

Plans $30-Million Refinery

Eastern Mining & Smelting Corp. will spend about $30 million on a new mineral refinery and power plant at Chicoutimi, Que. It will turn out about 300 tons of pig metal a day in addition to several hundred tons of sulphuric acid.

Ex-Cell-O To Build in West

Ex-Cell-O Corp., Detroit, will build a 50,000-sq-ft plant in Downey, Calif. Products: Precision aircraft parts and drill jig bushings.

Perfect Circle Expands

Perfect Circle Corp., Hagerstown, Ind., is constructing a $1-million plant to serve as the distribution center for its products. Floor space at the main plant now used for this purpose will be available for expansion of plant office and manufacturing facilities.

Installs $300,000 Furnace

U. S. Porcelain Enamel Co., Los Angeles, is installing a $300,000 furnace for firing porcelain enamel.

Orders Slabbing Mill

Steel Co. of Canada Ltd., Hamilton, Ont., awarded a contract to United Engineering & Foundry Co., Pittsburgh, for a 46 x 100-in., 2-high slabbing mill. Delivery will be made next spring. The order includes auxiliary equipment for handling ingots up through the piling of the completed slabs. The mill is powered by two 5000-hp electric motors; it handles ingots up to 60,000 lb and produces slabs up to 72 in. wide.

Gets Harmark Product License

Prenco Products Inc., Hazel Park, Mich., maker of foundry materials and equipment, has been licensed to make Harmark foundry products in this country. Manufacturing rights were granted by Harborough Construction Co. Ltd., Market Harborough, England, pro-

FACT: New floating roll-table drive solves space, shock, maintenance problems

Basic facts show how Westinghouse floating gearmotors bring greater efficiency and economy to roll-type conveyor operations:

FACT 1: Space needs minimized by compact drive design
Shaft suspension of drive and absence of separate coupling give maximum spacesaving and assure greater operating safety.

FACT 2: Roll shocks cushioned by spring mounting
Spring mechanism on anchor arm and "on-shaft" mounting enable this gearmotor to withstand shocks and stresses from roll eccentricity.

FACT 3: Maintenance reduced by drive simplicity
Absence of couplings, simple yet rugged gear arrangement and integral design of over-all unit all combine to cut maintenance needs to the minimum.

For more facts on this or any Westinghouse gearing equipment, call *The Man With The Facts*... he's the Westinghouse sales engineer at your nearest Westinghouse sales office! J-07343

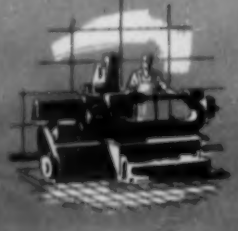
A locking screw and clamping plate lock this compact gearmotor firmly to roll-table shaft. All power is transferred to roll shaft at low unit pressures.

WATCH WESTINGHOUSE!

WHERE **BIG** THINGS ARE HAPPENING **TODAY!**

A complete line of Roller Bearings . . .

For every field of transportation and industry

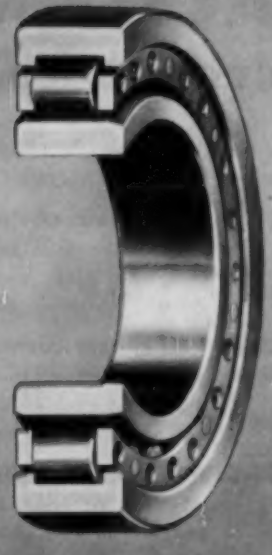


Job-tailored in a wide range of sizes to fit your specific needs

Aircraft? Automobiles? Earth-moving or farm equipment? Whatever you make, if your product uses straight or tapered roller bearings, Bower can meet your specifications exactly. For dependable Bower bearings are virtually custom-built to the job . . . engineered and sized to match any requirement.

Important, too, are exclusive Bower design features that assure long life, top performance, less maintenance. And when you specify Bower bearings you can always be certain of the highest quality materials and workmanship. These reasons, of course, are why Bower straight, tapered and journal roller bearings are used by leading manufacturers everywhere—for any application.

Let a Bower engineer give you full details of the complete Bower line. Call him in while your product is still in the design stage.



BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION • *FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICH.*

ducer of binders, dressings and adhesives for use with the carbon dioxide hardening process for foundry cores and molds.

Mueller Brass Opens Warehouse

Mueller Brass Co., Port Huron, Mich., opened a warehouse at 810 S. 53rd St., Philadelphia. It will stock copper refrigeration tubing, valves, fittings and accessories, plastic pipe and fittings. F. F. House is district sales manager.

Will Build in Florida

Minneapolis-Honeywell Regulator Co., Minneapolis, will build a plant near St. Petersburg, Fla., for the manufacture of a "new type aerial navigation system." Estimated cost: More than $4 million.

Offers New Line of Partitions

Reynolds Metals Co., Louisville, aluminum manufacturer, and E. F. Hauserman Co., Cleveland, maker of movable interior walls, have joined forces to introduce a new line of aluminum movable partitions for office, factory and institutional interiors. The new line will be in production early next year.

James-Pond-Clark Renamed

James-Pond-Clark Co., Pasadena, Calif., changed its name to James, Pond & Clark and has formed a new division, Circle Seal Products Inc. The firm makes check valves for aircraft and commercial uses.

Will Close Torrance Plant

National Electric Products Corp., Pittsburgh, is building a warehouse in the Vail Field central manufacturing district, Los Angeles. The firm also announced that it will discontinue production at its plant in Torrance, Calif.

Gets Titanium Research Job

National Research Corp., Cambridge, Mass., was awarded an Air Force contract for the development of "manufacturing methods and pilot production of titanium alloy castings." The firm has devised

(*Please turn to page* 111)

HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"

Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.

Fast acting single shears for use with hump tables in cut-to-length and press feed lines, and other applications to square crop the end of a coil. Also twin cut shears that remove the section where two coils were stitched or welded together for continuous processing.

Write for fully descriptive Bulletin No. 561 today!

THE HERR EQUIPMENT CORPORATION

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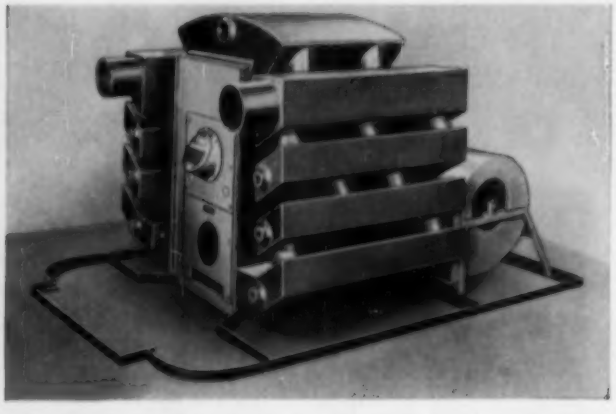
Alloy steel cap screws



SAFE, GAS-TIGHT JOINTS required by the down-flow construction of this year-round furnace and air-conditioning unit are easy to obtain, using Republic ELECTRUNITE® Mechanical Tubing. Its uniform roundness, wall thickness, strength and ductility help simplify design and fabrication. Quality control from raw ore to finished product assures long, trouble-free service.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

assure hermetic seal permanence

One of the most critical points in maintaining an absolute hermetic seal in any refrigeration system is the joint between compressor cylinder and head. That's why Copeland Refrigeration Corporation of Sidney, Ohio, manufacturer of fine commercial refrigeration and air conditioning compressors, insists on cylinder head cap screws made to exacting specifications. Republic Alloy Steel Hex Head Cap Screws fill the bill perfectly. They more than meet tensile strength, yield point, hardness and ductility requirements.

Design of the Copeland Compressor calls for cap screws to clamp cylinder head, a neoprene gasket, valve plate, another neoprene gasket and cylinder block into one solid, leakproof assembly. Year-in, year-out service dependability demands that these fasteners neither stretch nor lose their grip under the heating and cooling cycle of on-off operation. There must be no loss in compression or escape of refrigerant. Again, Republic Alloy Cap Screws are more than equal to the task—as proved by their failure-free performance record.

Whatever your fastener problem, it will pay you to check Republic. 20,000 standard and 8,000 special types and sizes of headed and threaded products are available to satisfy a tremendous variety of applications. Each is backed by a century of experience, and quality controlled from raw ore to finished product.

You can get complete information through your local Republic office. Or simply mail the coupon.

OUTSTANDING PRODUCT PERFORMANCE is assured when you specify Republic Hot Rolled Carbon or Alloy Bars as your raw material. A full range of standard and special shapes, sizes and grades is available to meet the most exacting requirements. Further, Republic's 3-Dimension Metallurgical Service can help you select the proper type, and process it efficiently.

ZINC COATING PERMANENCE makes Republic Continuous Galvanized Sheet ideal for hundreds of mass-produced parts and products. Its uniform, corrosion-resistant zinc coating will not crack, flake or peel under any forming operations permitted by the base metal. Resulting product is far less expensive to produce than old-fashioned, hot-dipping after fabrication would allow. Send coupon for information.

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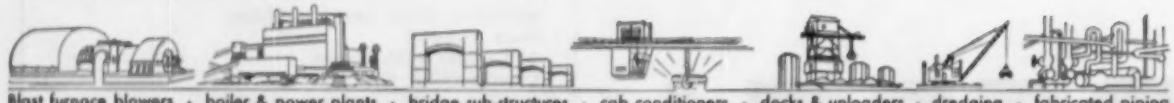
another DRAVO project:
10 MILE TUNNEL UNDER PITTSBURGH

Dravo has started work on a vital part of Allegheny County Sanitary Authority's new $80 million sewage system program. The job: to build a 10 mile long tunnel through rock at an average depth of 100 feet below the city. Called the "main interceptor line," it varies from 4 feet to 10½ feet in diameter. The tunnel will receive sewage through fifty-eight down shafts and carry it to a new sewage treatment plant.

Construction projects in and around water are routine for Dravo. Now underway are piers for a multi-million dollar bridge in New Orleans; a large harbor for ore boats on Lake Superior; docks for industries on the inland rivers. Some of the other products and services Dravo has provided business and industry for more than 60 years are shown below. DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION



Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

(*Concluded from page* 107)

arc furnaces for skull melting pure metal and alloys in a vacuum.

Opens Pressure Vessel Plant

Master Tank & Welding Co., Dallas, constructed a plant at Quincy, Ill., for the production of pressure vessels. Sam Weempe Jr. is plant manager.

Expands Transmission Plant

Fuller Mfg. Co., Kalamazoo, Mich., will add about $2 million in buildings and machinery to its Mossel avenue facilities. The addition will provide 112,000 sq ft of manufacturing floor space, doubling the present area. It will increase the Transmission Division's area to 470,000 sq ft.

Stanat Mfg. Builds Plant

Stanat Mfg. Co. Inc.—rolling mills, slitting lines and related metal processing equipment—is constructing a plant on Brush Hollow Road, Westbury, N. Y.

Buys Regulator Business

Electric Regulator Corp., Norwalk, Conn., acquired from Texas Instruments Inc., Dallas, the regulator business formerly handled by Burlington Instrument Co., Burlington, Iowa.

Activates Transmission Plant

New Process Gear Corp. activated its plant in Syracuse, N. Y., which was leased a year ago. It has been fitted out for production of automotive transmissions.

Armco To Build in Denver

Armco Drainage & Metal Products Inc., subsidiary of Armco Steel Corp., Middletown, O., will build a $550,000 fabricating plant in Denver. It will produce corrugated metal pipes and pipe arch, metal flumes, head gates, sluice gates, sewage gates and water control gates. It will have facilities for converting corrugated metal pipe to sewer pipe and for paving and coating pipe with asphalt. Armco recently purchased the gate producing facilities of Pekrul Gate

This Quick Demonstration At Your Desk Will Prove

How To Get Better, Economical Fastening With Townsend Lockbolts

A few minutes of your time invested in watching a simple demonstration of a better fastening method may point the way to savings of thousands of dollars in assembly of your products. The Townsend lockbolt provides a quick method of producing tight, rigid fastenings that cannot loosen even under extreme vibration or shock conditions.

We would like to have a Townsend engineer demonstrate to you and others in your organization how these lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. He will show you that installation is fast—that fewer workers can complete an assembly in less time—you improve your product—achieve a lower installed cost.

You will be able to see why the clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The demonstration will explain how the lockbolt fills the hole better than other fasteners—makes possible a more rigid joint and provides an effective liquid seal.

Townsend lockbolts are available in steel and aluminum alloy, in 5/16", 1/4", 5/16" and 3/8" diameters, in grip length ranging up to 2", in various head styles.

For a demonstration on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts write on your company letterhead to Townsend Company, P.O. Box 237-C, New Brighton, Pa.

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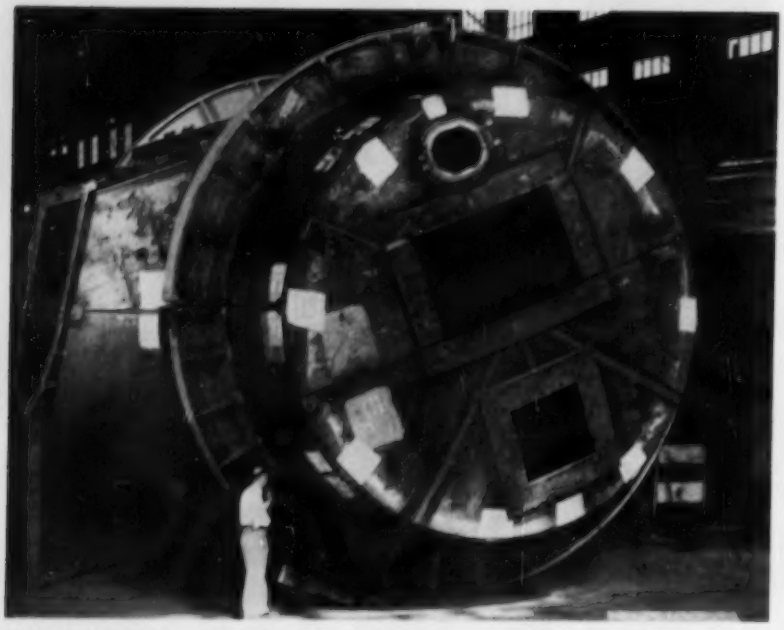


Photo Technique Aids Hot Metal Mixer Assembly

This 800-ton capacity hot metal mixer shell, spout and rocker bands were match marked and photographed before disassembly for shipment by Pennsylvania Engineering Corp., New Castle, Pa. Match markings in the photograph were used for field reference during erection at a major steel producer's plant. The shell plates of this mixer (inside diameter is 20 ft) are 1⅛-in. thick. Two bands encircling the shell are 24 ft in diameter. When erected on its stand, the all-welded unit will be about 33 ft high. A large screw tilts and discharges the unit

Division of Morse Bros. Machinery Co., Denver. C. W. Webb is manager of the Rocky Mountain Division.

Ternstedt Expands Warehouse

General Motors Corp.'s Ternstedt Division, Detroit, manufacturer of automotive hardware and trim, expanded its warehouse capacity by 40,000 sq ft at its plant in North Trenton, N. J. The structural steel was furnished and erected by Luria Engineering Co., Bethlehem, Pa.

Forms Aeronautical Division

T. R. Finn & Co. Inc., manufacturer of shock and vibration controls, Hawthorne, N. J., formed an Aeronautical Division which specializes in the fabrication of prototypes and experimental units of jet, ram-jet and rocket propulsion engines and other complex welded assemblies of high temperature alloys. The company's plans to double its facilities are well under way.

Buys American Pulley Stock

Van Norman Industries Inc., Springfield, Mass., acquired 17,128 shares of common stock of American Pulley Co., Philadelphia, maker of power transmission equipment, material handling equipment and hydraulic lift trucks.

Outboard Marine Renamed

Outboard, Marine & Mfg. Co., Milwaukee, changed its name to Outboard Marine Corp.

Bostitch Enlarges Plant

Bostitch Inc. (stapling and stitching equipment) completed a 400,000-sq-ft plant at East Greenwich, R. I.

Buys Research Facilities

Firth Sterling Inc., Pittsburgh, purchased the Yonkers, N. Y., research and laboratory facilities of Schwarzkopf Development Corp. (formerly American Electro Metal Corp.). The two companies also are jointly interested in Borolite Corp., Pittsburgh, a manufacturer of products for ultra-high-temperature applications. The new headquarters of Schwarzkopf Development Corp. will be at 595 Madison Ave., New York.

CONSOLIDATIONS

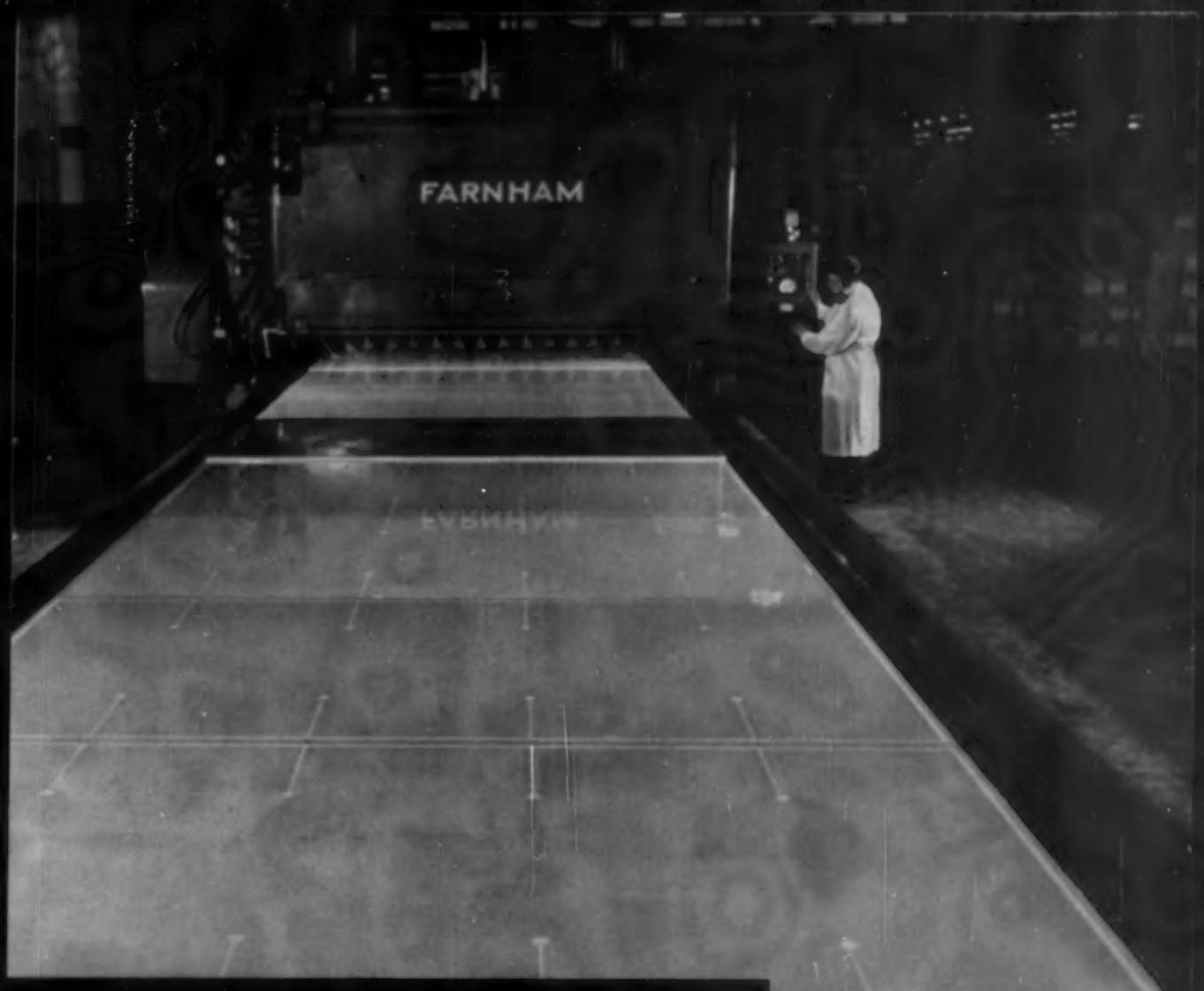
Siegler Corp., Chicago and Pasadena, Calif., manufacturer of heating equipment, electronic devices and power tools, acquired **Kinnaire Corp.**, Anaheim, Calif. Through purchase of this producer of residential central air conditioning equipment, Siegler enters the central air conditioning field.

Caspers Tin Plate Co. purchased **Century Display Mfg. Co. Inc.** and its subsidiary, **Paramount Metal Products Co.** All are in Chicago. Operations of the newly acquired firms will be consolidated at 4600 S. Kolin Ave., Chicago.

Swift Electric Welder Co. (electric welding machines) and **Ohio Machine Tool Co.** (heavy machinery) have merged to form Swift-Ohio Corp. Executive and sales offices are in Detroit, the plant in Kenton, O.

Perfect Circle Corp., Hagerstown, Ind., purchased **Corona Oil Specialties & Service Co.**, La Canada, Calif., maker of special oil well equipment. Jay P. Gould will manage the new Perfect Circle division.

New York Brake Co., New York, purchased **Optical Film Engineering Co.**, Philadelphia. Operated as the Vacuum Equipment Division of New York Air Brake, it will make high vacuum evaporators, high vacuum furnaces, packaged pumping systems, high vacuum components and special high vacuum systems. T. W. Johnson is group executive in charge of the Kinney Mfg. and Vacuum Equipment divisions. Vacuum Equipment Division officials are R. A. Denton, general manager; T. L. Scatchard, chief engineer.



King of the wide frontier

Installed for experimentation at CARBORUNDUM's Coated Abrasives plant in Niagara Falls, this spectacular new precision belt-grinding machine grinds a single piece 40 feet long by 86 inches wide *in one operation*. It's the largest machine of its kind in the world, and it opens brand new frontiers in grinding to close tolerances on many previously "impossible" jobs. By quick changes of abrasive belt, any variety of micro-finishes can be obtained. Even precision tapers and complex profiles are achieved automatically. CARBORUNDUM's many years of engineering skill in solving abrasive belt problems for industry resulted in this new wide-belt concept of precision grinding. For complete information write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

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QUALITY PROMCO BRAND
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-NOW FROM PROGRESSIVE-
CUSTOMIZED SERVICE ON PHILLIPS HEAD SCREWS=

Now you can get from PROGRESSIVE Phillips Head Screws with an extra customized touch — Phillips Head Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.
Division of The Torrington Company
76 Norwood Street, Torrington, Connecticut

Technical Outlook

OFF-ON MAGNETICALLY— Look for the new proximity switches (no moving parts) in many of tomorrow's machine tools and automated assembly lines. Essentially a magnetic detector, it works through an electronic circuit. Steel parts that pass within ⅛-in. of its sensing poles trigger it. Parts can be in liquids or on conveyors. Frequency limit: Ten per second. First application will be in Ford Motor Co.'s engine block lines ('58 models) at Cleveland, Lima, O., and Dearborn, Mich. About flashlight size, the switch was designed by Minneapolis-Honeywell Regulator Co.'s Doelcam Division, Boston.

FASTER TESTS—Chance Vought Aircraft Inc., Dallas, is testing a new high intensity fluoroscope developed by the Navy to permit fast detection of flaws in metal castings for aircraft. The firm will inspect 2000 large and small steel and magnesium castings. Results will be cross-checked with those of x-ray tests.

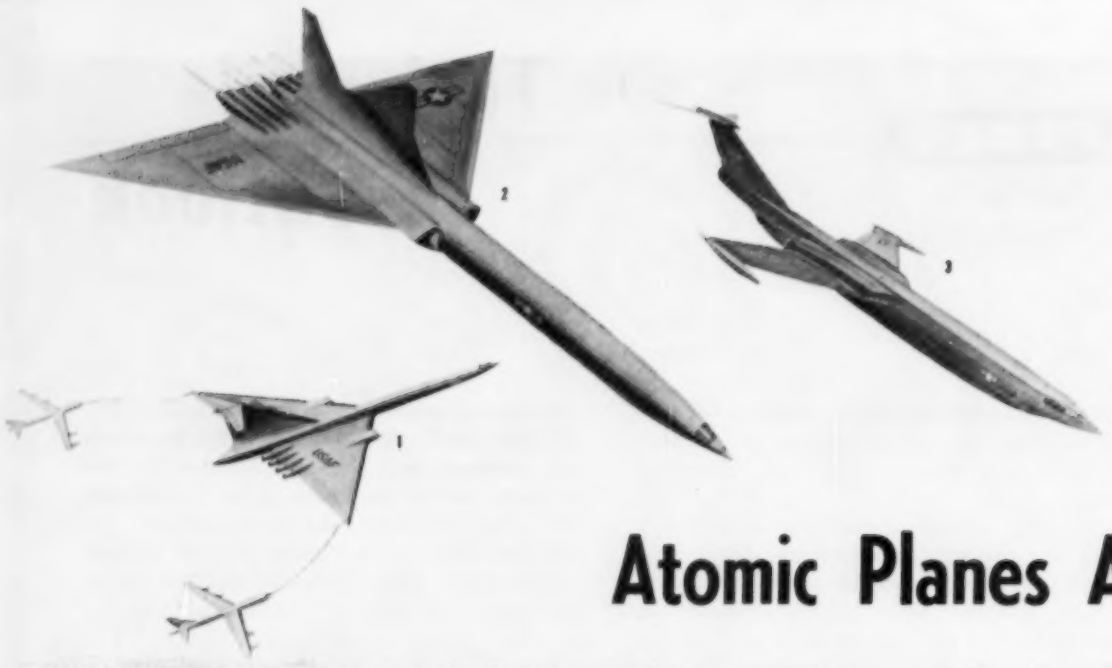
MISSILE CARRIER—To develop and test ramjet engines, Lockheed Aircraft Corp.'s Missile Systems Division, Van Nuys, Calif., uses a needle-nosed version of a target plane. Test engines are attached beneath. Launched from a B-29, rockets push the vehicle to operating speed before the ramjet is ignited. Parachutes insure its safe return.

FUTURE BRIGHT— Superior Tube Co., Norristown, Pa., sees a bright future for small, precision drawn tubing in atomic energy. The company has supplied 3 million ft of stainless tubing for Du Pont's Savannah river atomic project alone. Tubing most in demand: Zirconium and Zircoloy (because of its low neutron absorption), ingot iron, stainless grades 304, 347, 348 and Inconel. Paul E. Kelly, Superior's vice president, says tubing is required for fuel elements, reactor structural parts, coolant handling, heat exchangers and piping systems. "In addition," he reports, "every reactor requires much auxiliary processing and handling equipment which also uses a lot of tubing."

SPARS FOR U. S.—The Air Force has accepted what is said to be the most powerful spar milling machine ever made. (It has a $6-million order for 30 of them.) Farnham Mfg. Division, Wiesner-Rapp Co., Buffalo, lists these data: Carriage speed of 300 in. a minute, four 100 hp heads, and automatic trace equipment accurate to 0.001-in. The machine accommodates parts up to 3 x 60 ft.

GAGE FOR TORQUE— Strain gages are featured in a novel method of measuring the input and output torque of variable speed drive units. The units are connected to a dynamometer drive and output which are held in position by two load beams equipped with strain gages. Strain is measured electrically; the dial indicates torques up to 1250 inch-pounds.

X-RAY MEASUREMENT— A new x-ray fluorescent instrument has been developed by Applied Research Laboratories, Glendale, Calif. It continuously measures the thickness of a metal coating to a millionth of an inch. The instrument is tailored to meet the needs for gaging or continuous analytical control in operations where a single element determination is important. The design is rugged enough to be used on the production line.



Atomic Planes Are

First test flight of an atomic powered plane may take place soon. But many problems remain to be solved. Development of construction materials heads list

PEOPLE who have the inside story on the A-plane can't reveal much because of security reasons, but they'll tell you that significant "breakthroughs" were made in the last few months. Smiles of scientists doing the tough jobs say "we're getting close."

A look at contracts being let reveals that the A-plane program is moving from the research to the developmental stage. For the first time, it's getting solid financial support.

Many problems remain to be solved, but one thing is certain: Many of the answers will be supplied by new steel, aluminum and titanium alloys, better superalloys, unique powder metallurgy products and (probably) ceramics and cermets (coatings baked on wings and fuselage sections, for example).

How Close? — This much is known about the progress of the A-plane:

Heat from an experimental reactor has been used to power a turbojet aircraft engine in ground tests. Flight tests may come soon.

A B-36 with an atomic reactor in its nose (power is conventional) has been flying out of Texas for several months.

One expert in industry predicts a nuclear powered prototype of a military plane may be ready for flight tests in two or three years.

Sources — Lewis Strauss, AEC chairman, told a House appropriations committee about the nuclear powered turbojet engine. He also said: ". . . the pace of this and other projects is being accelerated in an effort to have a prototype ready for flight."

Convair Division of General Dynamics Corp. is in charge of the B-36 project under way near Ft. Worth, Tex.

The prediction about the debut of the nuclear powered military plane was made by Lee A. Ohlinger, chief, Computing Center, Northrup Aircraft Inc., Hawthorne, Calif. (He also supplied sketches of the A-plane which appear on these pages.)

Prospects — The best available appraisal of the over-all program came from the McKinney panel report to the Joint Committee on Atomic Energy early this spring:

"The commission (AEC) and the Department of Defense are engaged in a joint research and development program directed toward practical atomic propulsion for military aircraft. On the basis of the work of the program to date, atomic propulsion of aircraft appears feasible—if technological developments proceed as now foreseen.

"The program is thought likely to require between half a billion and one billion dollars to accomplish and has as its objective a military airplane in which economics are not a primary consideration.

". . . though technical prospects for military aircraft with atomic propulsion are considered good, prospects for economically competitive commercial applications seem unlikely until some experience with military prototypes has been acquired. . ."

Industry Speaks—In a talk before the SAE Natinonal Aeronautical meeting late this spring, Mr. Ohlinger put these dates on the A-plane program:

". . . a prototype nuclear powered aircraft should be with us within three to ten years, and may even be flight tested as early as 1958-59. The lower figure is only applicable to military aircraft, while the higher one is the earliest at which we might expect nuclear powered commercial applications.

"Based on the experience of aircraft engine manufacturers, these

Closer Than You Think

1. This is how an A-plane could tow commercial airliners to their destination. The endurance of the crew would be the only limitation to its range. Airliners would need only enough fuel to fly to the A-plane's altitude, hook on and land

2. Logical design for nuclear aircraft is a long length-to-span ratio—to get as much distance as possible between the atomic power plant and the crew because of the radiation hazard. High strength metals will be needed for the airframe to support the weight of shielding and the single reactor concentrated in one spot. The reactor will probably service all propulsion units

3. The seaplane is a logical vehicle for nuclear power because its hull provides a practical design in terms of size, space and weight limitations

4. Concept of an atom powered bomber that would carry its own fighter escort. It would carry its fighters until its radar spots the enemy. Escort would be cut loose to take mother ship through heavily defended areas

5. Less conventional directions nuclear planes may take to handle the maintenance problem of the intensely radioactive power plant. The sketch portrays a separable power plant with its own supporting gear. The plane can be detached from the power plant and wheeled away

figures do not seem unreasonable, since it usually takes seven to ten years for a proposed new type engine to appear on the test block, and some two years more before it's in the air."

Horizons Unlimited

Why all this feverish activity to get the A-plane into the air? The statements of these authorities will give you an idea of the significance of the program.

Gen. Thomas D. White, vice chief of staff, USAF, says: "The only other Air Force project with as high a priority as the long range missile is the nuclear powered airplane.

"Although this airplane will have high speed, its real value will be in its unlimited range and endurance. This would give us an unlimited choice of tactics. We could retaliate against any aggressor nation at any point of its border, from any direction. This would impose on the aggressor a staggering air defense task.

"The atomic airplane could be a retaliatory answer to an enemy long range missile. Theoretically, we could keep a large proportion of an atomic powered retaliatory force air-borne all the time. It could be positioned to accomplish its mission immediately if an enemy were to launch an attack.

". . . a nuclear powered, water based plane may become an effective bomber suitable for the Air Force's strategic bombing mission.

"One thing is sure," said General White, "we have passed the point of uncertainty. We know we can build a nuclear powered airplane. Sometime within the next decade you will see it flying."

Flying Boats

A speech made by Charles S. Thomas, secretary of the Navy, underscores the importance of atomic engines for seaplanes:

"The application of jet power to seaplanes and eventually nuclear power opens up an entirely new realm for naval aviation. . . It now seems probable that the next improvement to seaplanes will be nuclear power.

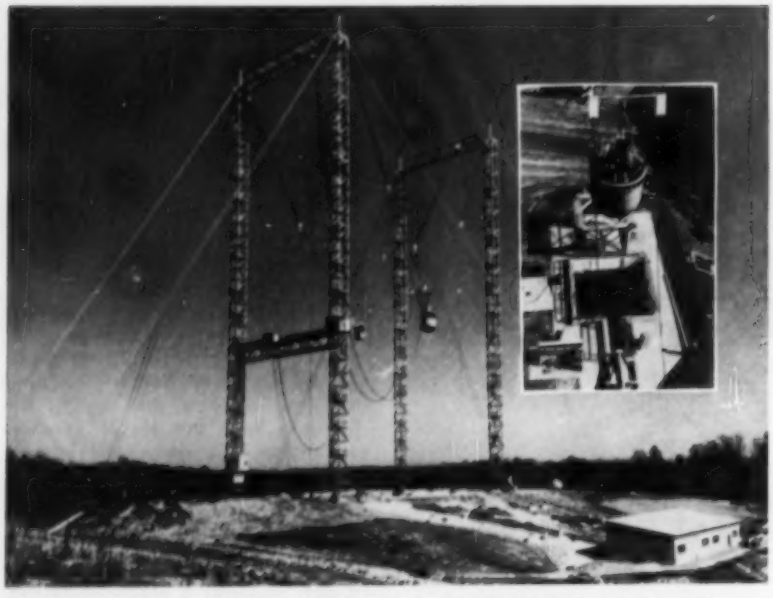
"This is logical for many reasons," says Secretary Thomas. "Any mishap to a nuclear powered seaplane would not only give added insurance against loss, but since it would operate over the ocean, the radiation and contamination hazards of flying over populated or industrial areas would be eliminated. Certainly the psychological problem of flying any nuclear airplane would be far less for a seaplane than for a land plane.

"The seaplane is a logical vehicle for nuclear power because its hull provides a practical design in terms of size, space and weight limitations. In addition, sea water is an excellent shield against radiation."

Work in Progress

With such goals in sight, it's no wonder that substantial sums of money are being poured into the A-plane program. Here are some of the projects.

At the Oak Ridge National Lab-



The tower shielding facility at Oak Ridge National Laboratory will provide valuable shielding data on nuclear reactors in the sky. Reactor suspended on right simulates A-plane radiation for instruments on left. Elevation and separation distance can be varied. Inset is close-up of reactor over storage pool

oratory, Oak Ridge, Tenn., four 315-ft towers (joined in pairs at the top by 100-ft trusses) comprise what is known as a reactor shielding facility (above). The reactor shield and detector compartment tanks are suspended by cables controlled by hoists to vary the elevation and separation distance.

It's part of a program to study problems of radiation in an airborne reactor — so recommendations on the size and shape of an A-plane can be made.

In preparing for the flight of an A-plane prototype, the AEC is putting in 16,000-ft runways at its Arco, Idaho, Reactor Test Station.

At Sandusky, O., the National Advisory Committee for Aeronautics is building a $4.5-million nuclear reactor to study problems related to nuclear propulsion systems.

Industry's Role—Private firms are prominent in the program. Lockheed Aircraft Corp. is working on a $100-million A-plane development center in Georgia. Along with Convair, the company will concentrate on airframe problems.

Take a look at help wanted (engineers for nuclear work) ads in newspapers and technical journals. You'll see the names of many new companies in the field.

The two main contractors of the A-plane engine — General Electric Co., Evendale, O., and Pratt & Whitney Aircraft, Hartford, Conn., are moving at a fast clip. They, too, are rounding up personnel for a long range program with promises of "unequalled opportunity to be among the pioneers of the coming atomic air age."

Glenn L. Martin Co. and Convair, among others, have contracts to study atomic seaplane possibilities.

Unknowns

Of course, pioneers have their problems. The optimism of the military does not overlook this.

Says General White: "We are entering an unknown field in developing the nuclear aircraft. We are just beginning to learn the problems in the field of radiation.

"Problems such as these: How much shielding is required to protect the crews from radiation? How does radiation affect the airplane, the hydraulic fluid and the electronic components? Solution of these problems will indicate the best airplane and airframe design."

Specs—It's no pushover to build the A-plane for supersonic speeds at ceilings of 50,000 ft or higher and still be safe enough for the crew to match the engine's great endurance.

It means there's a great deal of closely co-ordinated technical work to be done on the ANP (Aircraft Nuclear Propulsion) program.

Aside from shielding problems noted by General White, at every turn the problem of heat faces the A-plane engineer.

Inside his reactor he needs tough metals that will stand temperatures of 2000°F or higher and not be deteriorated by high level radiation and neutron bombardment. And if the A-plane soars along at a supersonic clip, its skin will get hot. This calls for metals that will keep high strength in the "twilight" temperature zone—500 to 1000°F—for airframe design.

Better Metals Hold Key

Nuclear fuel is merely a substitute source of heat energy. This energy is transferred to a cooling media (see diagram, page 119) which, in turn, delivers it to a piece of mechanical equipment such as a heat exchanger or engine. The maximum temperature that is useful is determined by the metallurgy of engineering materials. Other factors, such as heat removal, conservation of neutrons, sizes of reactor vessels and attendant equipment coupled with neutron and radiation shields, require massive structures.

A long length-to-span design is getting a lot of attention. Its features, protection of the crew from radiation, shielding and concentration of the massive power in one location, emphasize the need for strong, rigid frame metals that will not relax when the skin temperatures rise at supersonic speeds.

Here's another problem: When an airplane lands, it usually weighs less than when it left the ground. Builders take advantage of this in design and choice of materials used in landing gear.

The weight of a nuclear plane would change less than a pound over a long period of operation. Its weight would be the same on landing as on take-off—with exception of changes in payload.

Here's how Northrup's Ohlinger puts the material problem: "The full energy capabilities of the nuclear power plant are limited by the

Table I—Elevated Temperature Properties of Thermold J

Composition: C 0.53; Mn 0.34; Si 1.11; Cr 4.95; V 0.98; Ni 1.49; Mo 1.38

Test Temp °F	Proportional Limit PSI	Yield Strength 0.02% Offset PSI	Yield Strength 0.2% Offset PSI	Tensile Strength PSI	% Elong.	% R.A.	Hardness Before Test	Hardness After Test
500	183,300	200,000	227,900	285,300	10.0	26.0	54RC	52RC
500	194,000	216,500	240,000	288,500	9.1	27.5	54RC	52RC
600	185,700	198,400	212,700	276,300	9.4	31.7		52RC
600	175,600	197,000	221,900	272,600	10.0	31.3	54RC	51RS
800	181,100	193,900	214,300	260,200	8.2	29.5	54RC	52RC
800	192,300	200,000	218,600	259,300	8.4	29.4		52RC
1000	187,800	197,000	209,100	229,400	7.6	39.0	54RC	53RC
1000	181,900	194,700	212,200	235,100	7.4	38.3		53RC
1200	52,100	59,400	66,700	74,500	24.1	84.4		38RC
1200	55,300	59,300	65,800	74,400	36.4	82.0		38RC

Bar Stock—Heat treated at 1800° F, air cooled
Tempered 2 plus 2 hours at 600° F.
Tests made by Universal Cyclops Steel Corp., Bridgeville, Pa.

radiation, high temperature and corrosion properties of the materials of construction—not only of the reactor itself but also of other components of the power plant and airframe."

The need for strength at elevated temperatures has given choice of material a dominant position in all aircraft programs—nuclear or otherwise.

More Steel in Picture

To meet increased strength and temperature requirements, stainless and alloy steels have prospects of becoming more widely used as airframe materials.

For example, a group of hot work die steels have been used for many years for tools requiring a high degree of toughness and strength at elevated temperatures. A number of them have a wide hardening range. Their potentialities for aircraft structures subject to aerodynamic heating are being explored.

Alloys—Alloys being studied include Thermold A, B, and J compositions (Universal-Cyclops Steel Corp., Bridgeville, Pa.) and Halcomb 218, Chro-Mow and Peerless J (Crucible Steel Corp. of America, Pittsburgh). Table I on Thermold J shows that it keeps a strength well above 200,000 psi at temperatures up to 1000°F. These data are typical of those being collected on a number of steels to determine their use in airframe design. Light metal alloys available today lose strength in the 500 to 1000°F range.

Another reason for interest in these steels is their low thermal coefficients of expansion, which are similar to titanium and ferritic stainless. This means stress induced by thermal expansion is minimized.

Supercritical — Although materials have always been a problem in building nuclear reactors, the problem has never been as critical as it is in building an A-plane engine.

Here the propulsion system must have the maximum ratio of design power output to over-all weight. The reactor shield combination must be compact so it can be installed in an aircraft fuselage.

Maximum specific power and minimum size mean a high performance reactor—one with a large heat production per unit volume. To remove this large amount of heat per unit volume an extremely efficient heat transfer system will be needed. Liquid metals may be used for this purpose.

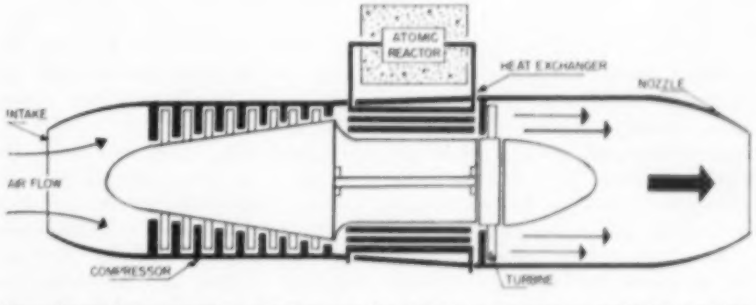
The airframe structure is also influenced by the size of the reactor shield combination.

In a conventional airplane, the weight is comprised of the payload, power plant, fuel and airframe. Take the nuclear plane: If the payload, power plant and airframe weights remain the same, the reactor and shield combination should weigh about as much as the fuel in a conventional plane.

Some modern aircraft have fuel weights of 75 to 100 tons. The reactor and shield could approach that weight. This, together with the knowledge that the nuclear equivalent of 6 or 7 ft of concrete is required around the reactor core for shielding, means that ANP is working with large aircraft.

Chapter I—Without getting into classified information, this is about as much of the story that can be told at this time. The announcement of "breakthroughs" and the smiles of scientists hint that the first chapter on the A-plane is nearly finished. With the emphasis switching from research to development, it's time for industry, metalworking in particular, to step into the program.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



How heat from atomic reactor can be used to power a turbojet engine. The characteristics of nuclear heat will require the use of unique by-passing and heat exchanger techniques. Engineering materials will play a large part in determining the maximum temperature that is useful

Here's the secret of job traffic in the toolroom: This dispatch board holds travelers for each job in a slot corresponding to the machine center. When an operator finishes the job, he checks in with the foreman and the traveler is moved to the slot representing the next operation. Travel on the board duplicates flow of the job

A Toolroom Goes Job Shop

Figuring the toolroom should work on a schedule that tied in with the production line, these specialists put it on a job shop basis. Results even surprised old timers

YOU MAY classify a toolroom as a nonproductive department, but you aren't getting the most out of it unless it's integrated with the production line.

That's the opinion of Warner & Swasey Co., the Cleveland machine tool builder. It has led to a new system of "traffic control" in the W&S toolroom.

Right Hand—Feeling that their toolroom must serve as a full time partner in the production line, supervisors decided that the flow of tools, jigs and fixtures through it had to be correlated with their use in the shop.

This meant that tools would be pulled from the shop only when they could be spared. It also meant that tools would be back in the shop in an up-to-date condition when they were needed again.

Here's the system they devised.

Initiation—Take the case of a fixture for a horizontal boring mill. Request for repair or alteration of the tool can come from three sources: Tool design, product design or the foreman of the department using the tool.

In all cases, tool design winds up with the request for processing. A designer digs out all the prints on the fixture and makes the required changes.

Coded—He then estimates the number of hours it will take to make these changes in the toolroom. At the same time, he codes the job with an "A" for tools urgently needed in the shop (authority for this code must come from the shop superintendent); "B" for tools needed to produce the parts that have no substitute; and "C" for tools that can be spared but are the most economical for the job. Full information on the job, including the code, is entered on a Shop Tool Order.

The decision for assigning a "B" or a "C" classification is left with the tool designer, subject to the approval of Art Heidenreich, manager of the tool design department.

The tool designer enters in a logbook the time he estimates will be needed to complete the alteration. The department allows itself 500 hours of toolroom time a week, 200 for new tools and 300 for alterations.

(The 500-hour figure is based on 1000 available man-hours in the toolroom. W&S's experience shows that planned work on a fixture or a tool will take about one-half the time the part is in the toolroom. The other half is allowed for restoring worn parts or reconditioning the tool to agree with the prints.)

Release—With this work completed, tool design issues the nec-

At pre-inspection, tools are checked before they go to the toolroom. It assures that any additional work needed to restore the tool to blueprint condition will be done while it's in the toolroom

essary papers to get the tool released from production and to give specific instructions to the production department, the inspectors and the toolroom.

The tool is released from the production line by the production department and is sent to inspection. (If the release of a tool is refused three consecutive times, it is automatically reviewed by the tool design department and its duplication is considered.)

At pre-inspection, the fixture is given close look, dimension by dimension, to check for worn parts, omissions or other departures from the drawings. These are tagged on a rider to the S. T. O. form for correction while the tool is in the toolroom.

Pre-inspection at this point is the W&S way of maintaining tools in first-class working condition. It augments the occasional requests by foremen.

Key to Location—After he has checked the tool, the inspector sends it, with all the prints and the S.T.O. form, into the toolroom. Here the foreman notes the work to be done, orders the parts and materials needed and puts each job (with the parts or materials needed to do it) in a bin.

The location of that bin is marked on the job traveler. The toolroom foreman feels that one of the biggest advantages of the new system is this locating of all work within the toolroom. There is no longer any need to waste time tracking down parts or materials for a job.

Traffic Control — Tickets for each part of the tooling are placed in a giant dispatch board.

Drawings are made showing complete assembly for each tool. Each component is detailed separately, so prints can be given to different machine centers and work done simultaneously on several components of the tool.

Once a ticket starts moving through the sequence on the board (and the part goes through a corresponding sequence in the toolroom) nothing stops it. This is another strong point in the system, with the foreman as overseer. It precludes the traditional toolroom menace of several jobs lying around because they got interrupted.

By scheduling the jobs within the weekly time budget, it's assumed that once a part goes into the toolroom, it will be finished and out within a week. Once a month an audit is taken of jobs in the toolroom to make sure that traffic is clearing on schedule.

The biggest advantage to the production line lies in the control of the tool's whereabouts. Howard Geyer, shift superintendent, says that with the new system tools are released for modification at a time convenient to the production line. More importantly, if the tool is due back on the line on a specified date, experience has proved it will be ready.

2930-1012	30	NAME: Turret Cam	39	DATE ISSUED: 5-9-56	CHARGE NO. DESIGN 42.02.35 LABOR 42.02.35 MAT'L AND. 4101	SHOP TOOL ORD. No. 00012 LETTER B QTY. 00
		DELIVER TO: Jig Inspection				
REVISION & ALTER: SAMPLE						
		1 - Drill Jig as per Change "A"			2930-1012-3	A-150698
		Change "A" - [redacted]				
		Make all repairs necessary for this tool to function properly.				
		Change due to Shop Request				
		TOOL CANNOT BE USED BEFORE ALTERING [redacted]				

CODE: A = URGENT B = NECESSITY TOOL C = ECONOMICAL TOOL

WARNER & SWASEY

SHOP TOOL ORDER

PRODUCTION SCHEDULING COPY

FOR INTERNAL USE ONLY

This Shop Tool Order (S.T.O.) form is made out in five copies. It calls the signals for the work to be done in the toolroom. It also tells how the job is coded (in this case "B"). The S.T.O. and all relevant drawings accompany the part through its entire cycle from production to toolroom and back

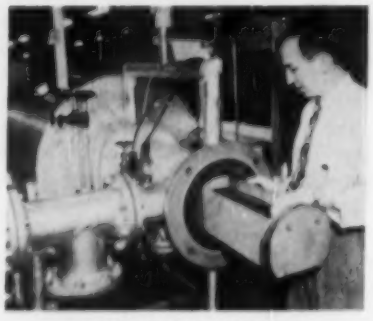
Heat Treating

YOU can finish machine small stainless steel parts before heat treatment. A process developed by the Allied Products Division, Hamilton Watch Co., Lancaster, Pa., will heat treat minute stainless parts without surface discoloration or dimensional distortion.

Watch—The method is an outgrowth of Hamilton's development work. Stainless is used for watch parts.

Atmospheric control is the key to the process. Gases are dried to a dew point of −60°F. The furnaces are especially tight to prevent atmospheric contamination. Where required, treatment may be carried out in several stages, including a final step in vacuum.

Unique — The process prevents distortion. Programming can be arranged to produce small amounts of growth or shrinkage to permit the salvaging of parts.



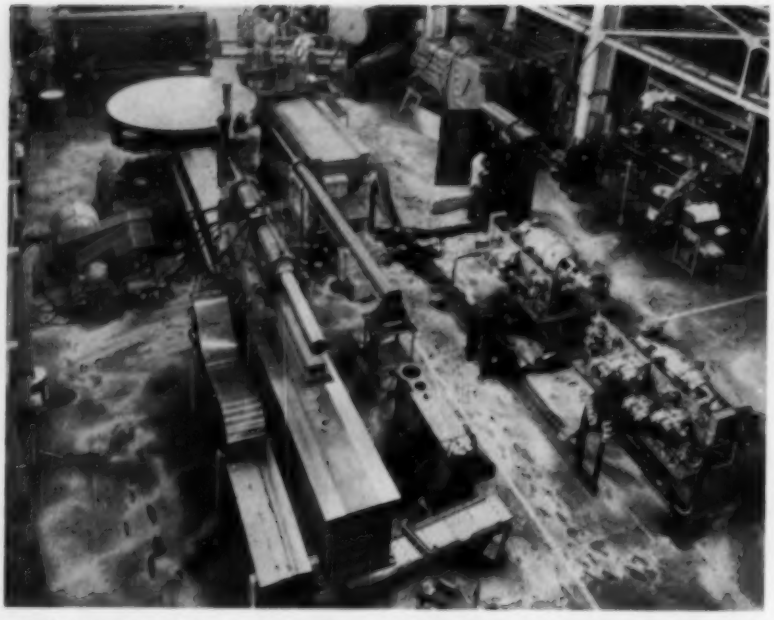
ATMOSPHERE FURNACE

. . . prevents discoloration

Here are some of the details:

1. To bright harden martensitic types of stainless (400 series), dry hydrogen and dissociated ammonia are passed through a Deoxo unit and Lectrodryer. Dew point is under −60°F. Vacuum is used for high tempering. 2. In annealing hardenable grades of stainless steel, maximum strip width is 5½-in. Strip in the 0.002-in. to 0.080-in. thickness range is continuously annealed. Retorts should handle coils up to 17 in. OD.

Allied Products says it will consider problems and heat treat sample batches on a no-charge basis. Data sheets for reactive metals like titanium, zirconium and hafnium are available.



This 75-ton radial draw former is 30 ft wide, 46 ft long. It will form structurals and skins for Lockheed's new propjet, the Electra

Big Former for Propjets

The radial draw former does rotary stretch forming with a compression planisher. This big one will make parts at Lockheed Aircraft Corp., Burbank, Calif.

ONE of the largest radial draw formers ever built by the Cyril Bath Co., Solon, O., will produce structural parts for Lockheed's new 420-mph, propjet airliner. The machine is about 30 by 46 ft. Its installed cost will be $350,000.

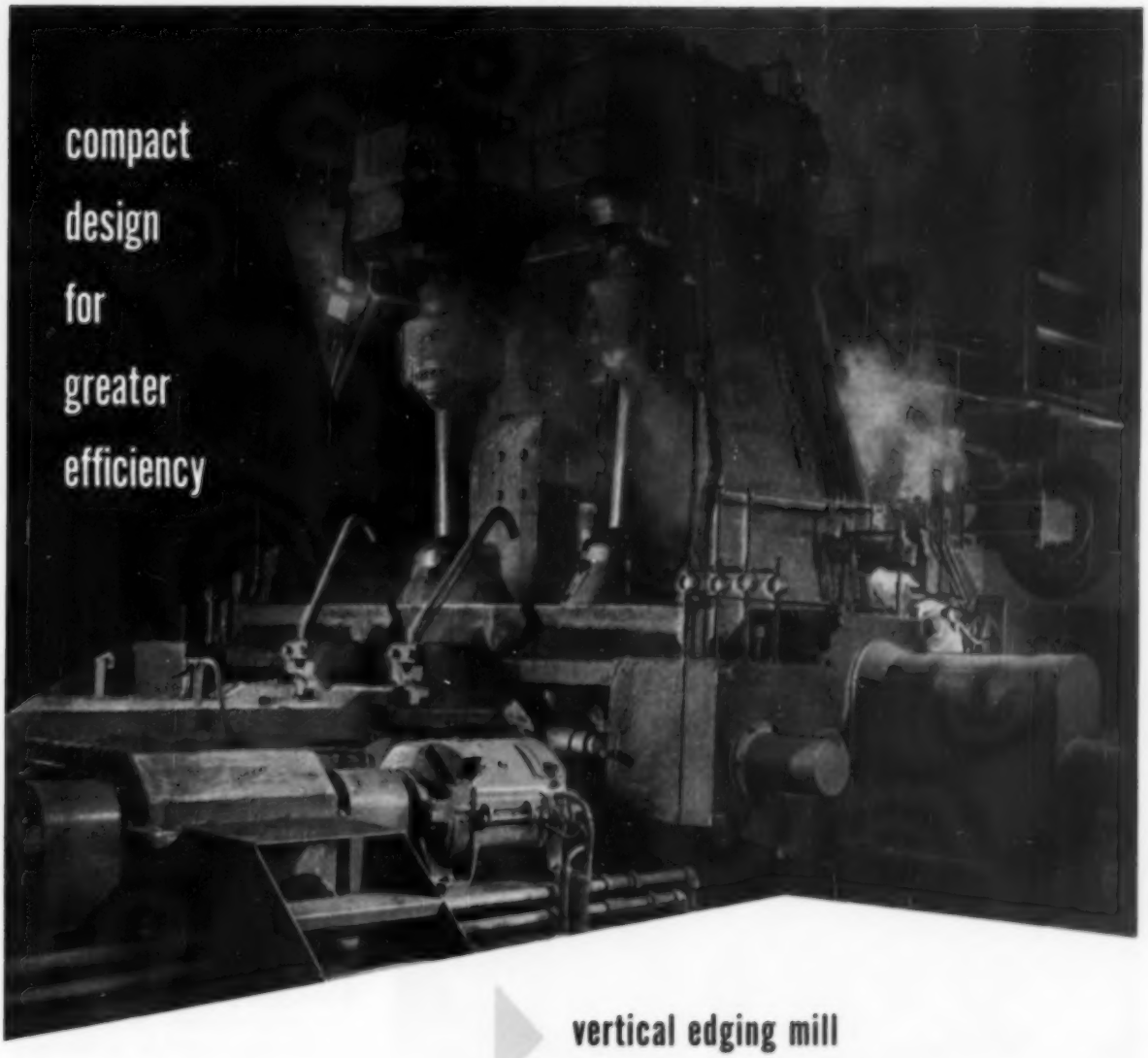
Advantage — Aircraft manufacturers have begun to show interest in forming equipment that will reduce trim or machining scrap and hand finishing. The Solon builder says its machine nearly eliminates springback and insures a superior metallurgical structure. It will form either soft metals or exceptionally tough ones like Hastelloy with equal accuracy.

Other specs: It will form all angles, make reverse bends in two planes, produce joggles and can handle variable cross sections. It will handle sheets or extrusions up to 23 ft long and 48 in. wide.

Process—In radial draw forming, the part is mounted against a die which is bolted to a rotary table. The part is held at each end by gripper jaws, one attached to the end of the die and the other to a hydraulic stretching ram. The part is stretched beyond its yield point to the plastic range. The rotary table turns, sweeping the die into the stretched material.

A side compression unit called a wipe shoe is used on the Lockheed machine. It is a planishing unit that operates on its own bed, parallel to the bed of the stretching ram. It assists the forming by wiping a female shoe or roll across the outer surface of the part. The compression unit has a capacity of 25 tons.

An electric control panel permits remote operation of all machine movements.



vertical edging mill

The overhead design of this edging mill is the key feature of this typical PITTSBURGH installation. Increased operational efficiency is a natural result of special design.

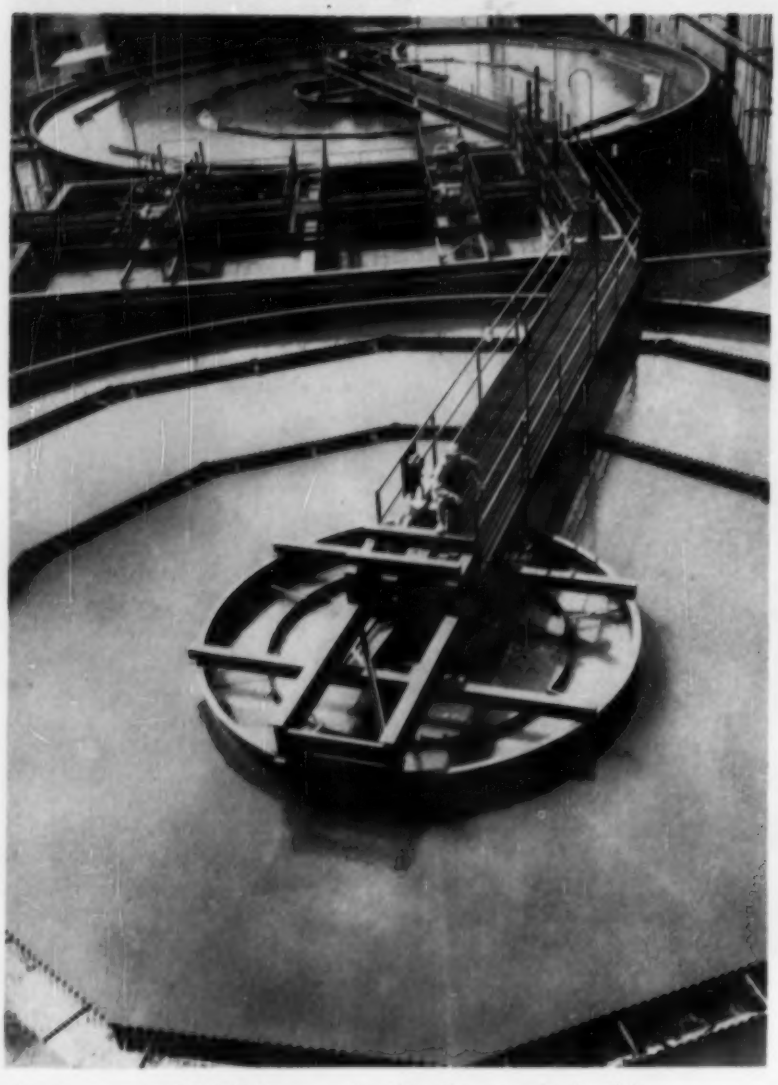
One giant casting *outlined in yellow in the photograph* was produced by Pittsburgh Steel Foundry Division. Extensive machining facilities are combined with one of the largest steel foundries in the world to produce the finest possible equipment for our customers in the shortest possible time.

We invite your inquiries for primary and auxiliary rolling mill equipment.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

Pittsburgh
ENGINEERING & MACHINE CO.

Division of Pittsburgh Steel Foundry Corporation
P. O. BOX 986, PITTSBURGH 30, PENNSYLVANIA
PLANT AT GLASSPORT, PENNSYLVANIA



At Armco in Middletown, clarification tanks build . . .

Good Will on the Water Front

Neighborliness and sound economics go hand in hand when a company recovers valuable raw materials and at the same time improves the quality of water leaving the plant

MIDDLETOWN, O., papers had good news for water-conscious readers not long ago. Over 3 million gallons of water a day, enough to fill 75,000 bathtubs, would stay in the ground because the town's big industry, Armco Steel Corp., had just completed a system to keep it there.

This may have seemed odd. Without conservation the ground held more water than town and plant needed, but the company was following a policy of long standing.

Looking Back—In the early days when the plant drew exclusively from the fluctuating Miami river, it was necessary to find ways to conserve water. When deep wells tapped a heavy flow in glacial river gravels, the company kept right on with conservation.

"We don't ever want to be in a position of depriving anyone of water," is the way Armco puts it. Its object is to draw as little as possible, recirculate most of it, recover any wastes of value, clean up the rest and send it to the river in better condition than the river water.

Latest Addition — The recently installed clarifier tanks (left) handle about 17.5 million gallons each day. About three-fourths of this is process and cooling water from the hot strip mills. The balance is river water which must be cleaned before it can be used.

Not long ago the company invested $1½-million in settling and skimming equipment which recovers 6000 to 7000 lb of mill scale an hour, and a lot of waste oil. The new installation captures the 3000 ppm of fine scale that the settling and skimming tanks miss.

Fine Scale—The partly cleaned water goes first to concentrators (the rectangular tanks in the center of the photograph) where lime and ferric sulphate are added. This causes the fine scale to flocculate or clump for faster settling.

From these tanks the water flows into clarifiers (the circular tanks shown). The fine scale settles to the bottom. Rotating rakes remove about 1500 lb of this valuable material each hour.

To New Use—The water which flows into the overflow troughs and out again into the plant contains only 25 ppm of solids. About 12.5 million gallons a day of it will be recirculated to the hot strip mill. Another 5 million gallons will be pumped to other parts of the plant to be used for cooling and process water.

Besides lowering the ground water requirements, the recirculation system has cut the use of river water by 7.5 million gallons a day. The investment in conservation hasn't gone unnoticed. In recognition of leadership in water conservation and elimination of stream pollution, the Ohio Conservation Congress last year awarded the company a certificate of merit.

HEY, YOU KRAUT-HEAD, GET YOUR ☆!!? STEAK OFF THAT HOOK --- I'M TRYIN' TO CHARGE NUMBER THREE!
THE DUTCHMAN'S SURE GONNA GET CLOBBERED THIS TIME. OLD MUSCLES IS SICK OF COMIN' DOWN HERE THE MIDDLE OF EVERY HEAT TO GET TH' CRANE OVER TO HIS FURNACE!
YEH, IF HE DON'T QUIT USIN' THE HOOK TO BROIL STEAKS HE'LL NEED ONE OF 'EM RAW FOR HIS EYE!
THANKS TO C.R HEILIG
KUEKES

The Short Order

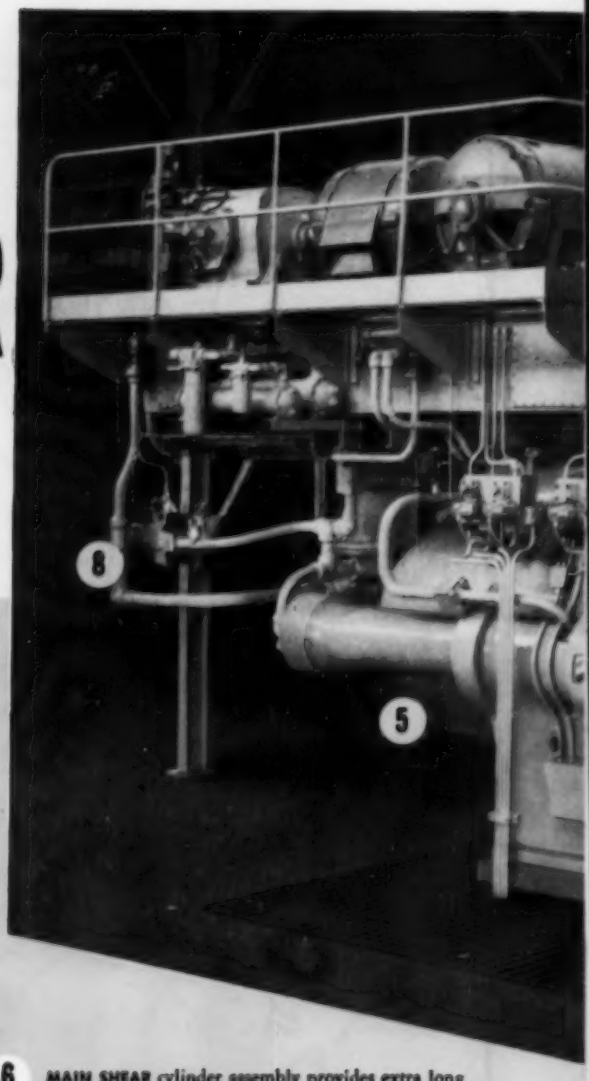
WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

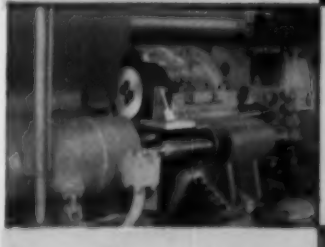
FEATURES TO REMEMBER

...when you buy an extrusion press



1 BILLET LOADER

mounted on container holder saves time by permitting loading of the billet into the loader during extrusion of the previous billet.



2 TRANSVERSE DIE SLIDE

speeds die changing and provides clear view of die for inspection and cleaning.

3 RUNOUT OPENING

machined for insertion of carbon canister gives better-finished extrusions.

4 RIGID BOX TYPE END PLATEN

typifies rugged, low stressed construction used throughout.

5 INSERTED STEEL CYLINDERS

low stressed, minimize the possibility of leakage or breakage. Lapped cylinders and pistons insure precision fit giving higher efficiency and longer life.

6 **MAIN SHEAR** cylinder assembly provides extra long square guiding required for most efficient shearing of the butt, especially when using porthole dies.

AUXILIARY SHEAR used for porthole work and for removal of stuck billets.

7 **CONTAINER HOLDER** radially supported to maintain alignment regardless of thermal expansion. Assures longer tool life and higher quality extrusions.

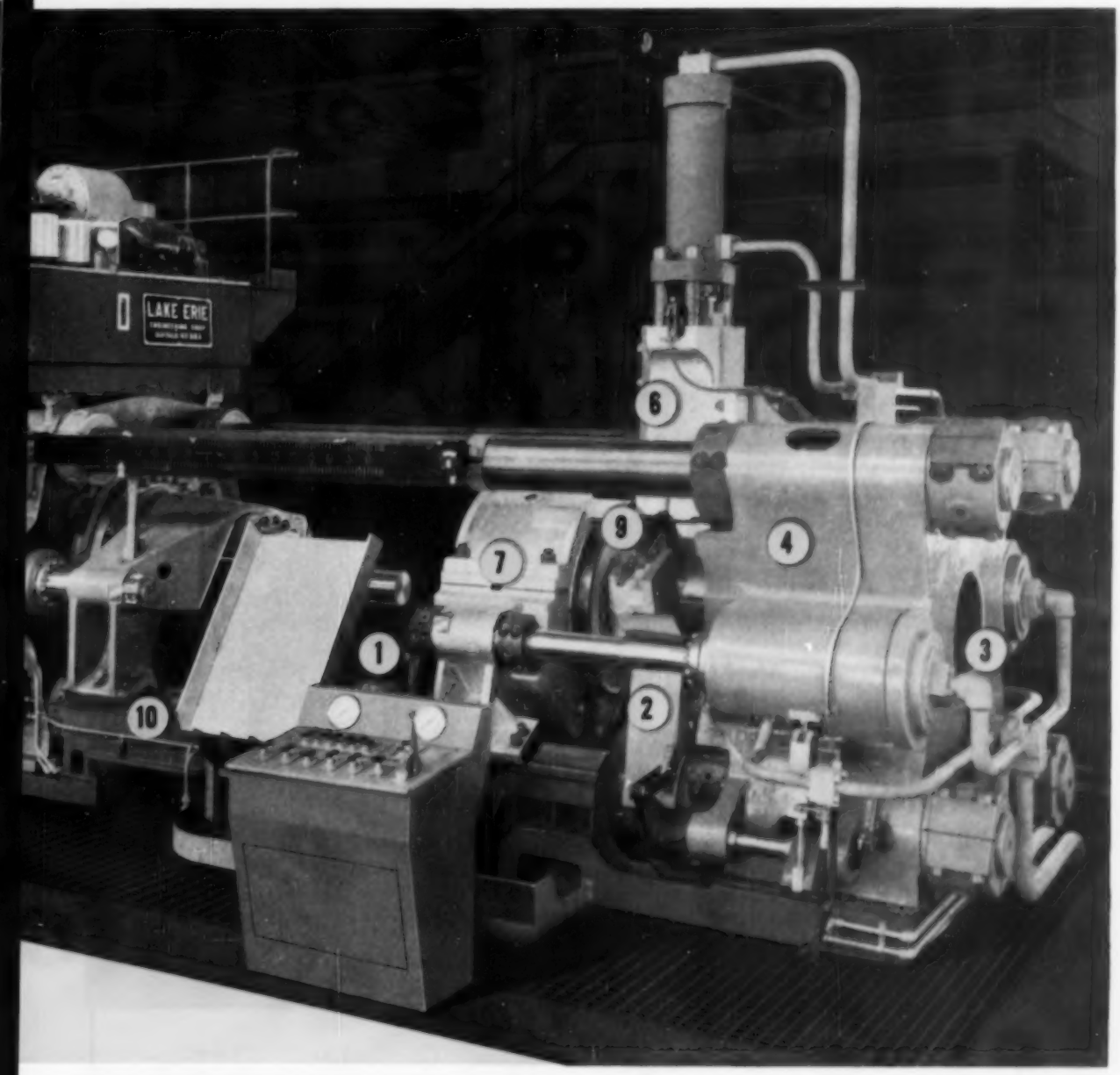
8 **ENGINEERED PIPING LAYOUTS** and generously sized valving speed press operation, eliminate shock and simplify maintenance.

9 **CONTAINER LENGTH** and stroke adequate to accommodate bridge-type porthole dies using full length billets.

10 **BRONZE** used extensively for guide ways and bushings to reduce friction and wear, to prevent scoring and provide better guiding.

●

Send for our new Bulletin 14.17 and inquire about our 16 mm. sound, color, extrusion movie.



Lake Erie brings you the greatest selection of design features in every type and size of extrusion press

FASTER, SAFER EXTRUSION CYCLE. This press incorporates the most complete automatic controls. Interlocks insure proper sequencing and limit switches automatically govern loading, container sealing, stripping and ram return. Throughout the complete cycle, these automatic functions speed operation and increase safety.

ROUND OR RECTANGULAR BILLETS. Lake Erie presses in all tonnages can be furnished for the extrusion of round or rectangular billets.

COMPLETE TOOLS AND DIES. Lake Erie is prepared to design and furnish complete tooling of all types.

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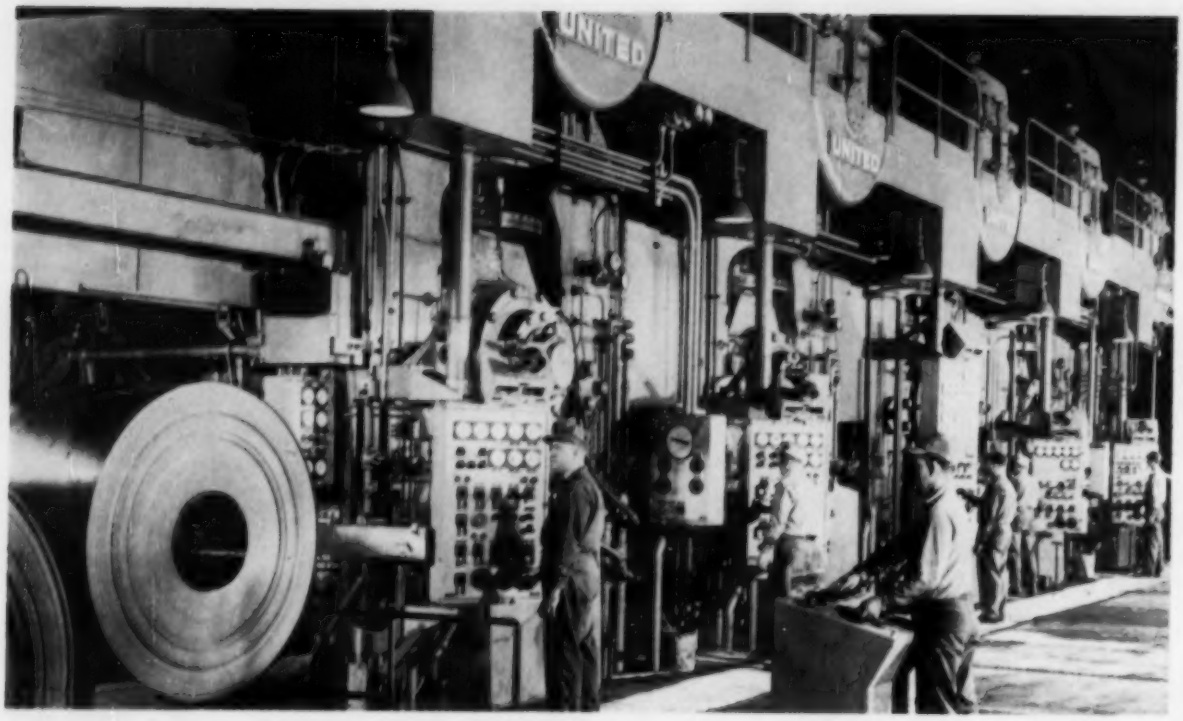


New 5-stand mill at Weirton Steel Co. delivers . . .

Cold Rolled Strip at 80 MPH

WEIRTON Steel Co.'s new 5-stand tandem cold strip mill, said to be the world's fastest and most powerful, is in operation at its Weirton, W. Va., plant. It has automatic thickness gage control.

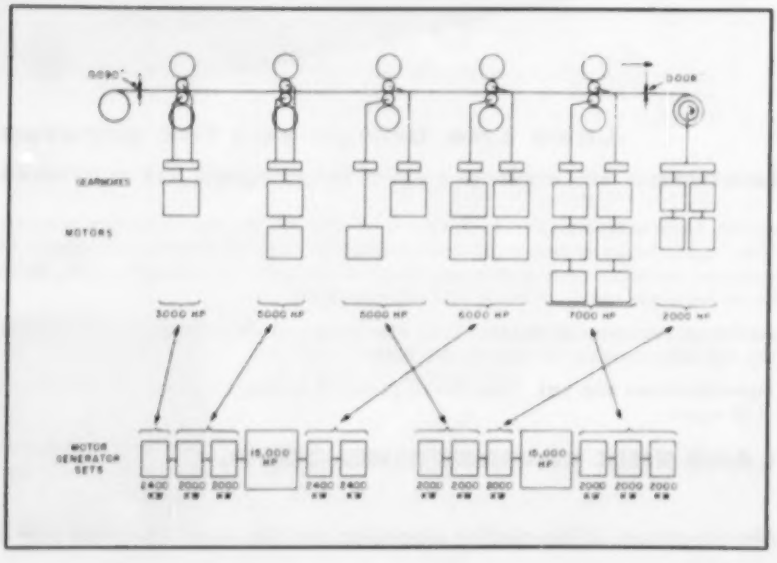
Part of a long range modernization and expansion program, the mill is designed to deliver over 7000 ft of steel strip a minute—enough to make about 80,000 medium size tin cans.

Power—It takes 28,000 hp to drive the five stands and the winding reel. The mill will roll strip up to 48 in. wide and deliver thicknesses down to 0.007-in.

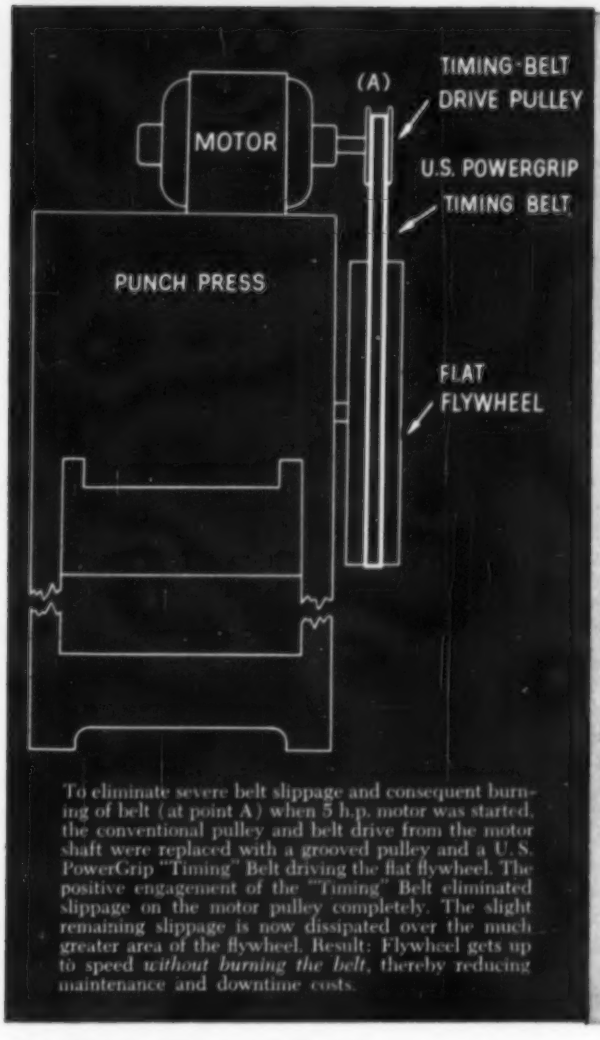
General Electric Co. supplied the motors, generators and other electrical apparatus. All mill equipment, as well as the electrical components, were designed and manufactured to meet special operating requirements.

Control—The mill control includes newly developed high-speed-of-response amplidyne power amplifiers, and amplistat preamplifiers in a regulating system designed to harness the 28,000 hp for fast, accurately co-ordinated acceleration and deceleration.

The drawing below shows the many motors and generators needed to drive the big mill.



PowerGrip "Timing" Belts



To eliminate severe belt slippage and consequent burning of belt (at point A) when 5 h.p. motor was started, the conventional pulley and belt drive from the motor shaft were replaced with a grooved pulley and a U. S. PowerGrip "Timing" Belt driving the flat flywheel. The positive engagement of the "Timing" Belt eliminated slippage on the motor pulley completely. The slight remaining slippage is now dissipated over the much greater area of the flywheel. Result: Flywheel gets up to speed *without burning the belt*, thereby reducing maintenance and downtime costs.

How a plant engineer made this press deliver a better punch

This is one more example of the U.S. PowerGrip "Timing"® Belt's ability to simplify and improve a power transmission unit . . . one of the reasons why the invention of this belt was recently awarded the Franklin Institute's Edward Longstreth Medal for "Invention of High Order."

Whether it's a plant conversion or original equipment design problem, U.S. PowerGrip "Timing" Belts offer the plant and design engineer all these advantages:

- *no slippage, no take-up—allows short centers, high ratios.*
- *absence of metal-to-metal contact—eliminates need for lubrication and housing devices.*
- *handles speeds up to 16,000 F.P.M. or so slow as to be imperceptible to the eye.*
- *close to 100% efficiency.*
- *imbedded with steel cables for high tensile strength.*
- *constant angular velocity.*

These belts—plus expert engineering service—are obtainable at "U.S." power transmission distributors, at any of the 28 "U.S." District Offices, or by writing us at Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

Air Force Specifies Automation

Contracts issued December, 1955, are pulled in long enough to add automatic numerical control systems to replace template controls on 22 milling machines

OFFICERS at Wright-Patterson Air Force Base, Dayton, O., held up contracts on 22 milling machines just long enough to change specifications. The machines, to be built by Kearney & Trecker Corp., Milwaukee, will be furnished with the latest numerical controls. Original specifications called for template controls.

Another step toward aircraft automation will come when 55 more template controlled contour and profile milling machines now under contract get like treatment.

Output Upped — The Air Materiel Command says it already has 48 skin mills under contract that are automatically controlled. Observers are guessing that they'll turn out about 50 per cent more work than present template machines.

The AF decision to go automatic was based on an AMC-sponsored study at M.I.T. First delivery of the converted machines is set for December, 1957.

Versatile Lubricant

Machine tool users may be putting the same oil in the hydraulic system, the cutting fluid sump and the lubricant reservoir. At least one oil company is studying a tri-purpose oil that could be used on a majority of machining jobs.

Chemists at the company's lab say the feat would be possible now under closely controlled conditions. Their goal: Broaden the potential to include maybe 80 per cent of the hydraulic needs, 50 per cent of the lubricant requirements and 40 per cent of the cutting fluid requirements.

Builder To Move

Cincinnati Shaper Co. will put about $2.5 million into expansion at its Whitewater plant west of Cincinnati. When the project is completed (scheduled for early 1959), the company will shift the remainder of its operations there.

Present headquarters in Cincinnati are adjacent to Lodge & Shipley Co., which will buy the abandoned property.

One Machine: Three Parts

Three types of pump compressor housings will be turned out on a 78-station transfer machine being built for Chrysler's Airtemp Division, Dayton, O.

The unit is scheduled to go into operation on Sept. 1. Fabrication is by Michigan Drill Head Co., Detroit. Cost is estimated at slightly over $1 million.

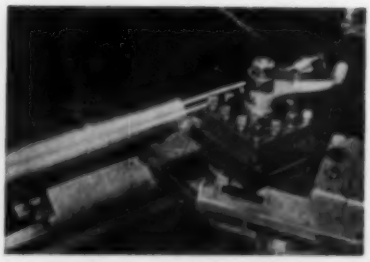
The top production goal, 90 pieces an hour, indicates a 40-second cycling rate. Only four men probably will be needed to operate the machine, although more will be used for inspection.

Looking for a 10 to 15 per cent increase in factory installed air conditioner sales from its auto divisions, Chrysler will use the machine to make its own pump compressors. It now buys them.

Sell to Russia?

Back from a six-week stay in England, Tell Berna, executive vice president, National Machine Tool Builders' Association, reports English builders would be delighted to sell their machine tools to Russia. He looks for a request from England to cut back the list that specifies equipment not to be sold behind the Iron Curtain.

English builders argue that Russia can get the machines elsewhere, but Mr. Berna sees Russian willingness to pay premium English prices as evidence that it can't get enough machines from other nations.



Cemented oxide lathe tool . . .

Cuts Finish Time

CEMENTED OXIDE tools have stepped up machine speeds and increased production over 100 per cent in finish turning 31-in. lathe spindles at R. K. LeBlond Machine Tool Co., Cincinnati. Work finishes also have improved.

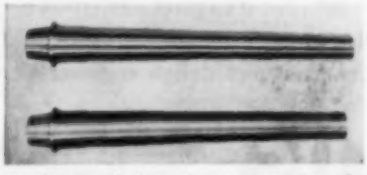
Time required to finish each spindle—minus loading time—was cut to 2.8 minutes under production conditions. Previously, with carbide as the cutting tool, the cut took 6 minutes.

Step Cut—The job calls for making a 12-step cut with a single point tool along 29 in. of the 31-in. spindle. The spindle is 3½-in. in diameter, stepped down to 2⅜-in. at the opposite end. The nose end of the spindle is not machined in this stage.

Spindles are roughed out on a 16-in. tracer-controlled engine lathe to leave a constant depth of stock between 1/64 to 1/32-in. Roughing feed is 0.0125-in. Finishing is done on the same type lathe.

Speed Doubled—With carbide, finish machining was run at 350 fpm. Now the work is turned at 715 fpm. After 20 spindles, it was necessary to resharpen the tool.

Use of the new Carboloy 0-30 cemented oxide tool boosted the machine output to 29 spindles before resharpening was necessary. Finish size in each run of 29 varied only about 0.001-in.



Finish provided by the cemented oxide cutting tool is indicated by the upper spindle. Same spindle is shown below in roughed-out condition

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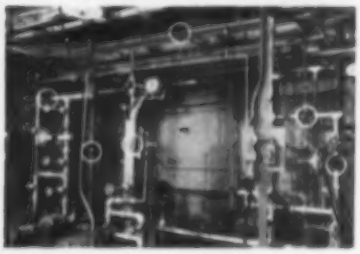

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Here are the latest techniques in ammonia gas nitriding, proper testing methods and the most recently discovered properties of nitrided steel parts

By HOWARD E. BOYER
Chief Metallurgist
American Bosch Division
American Bosch Arma Corp.
Springfield, Mass.

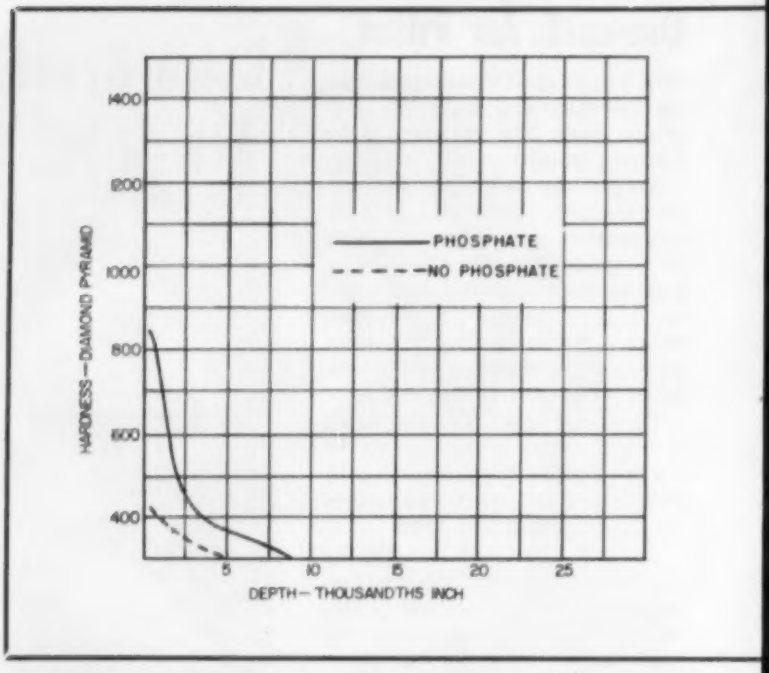


Fig. 1—Phosphate treatment promotes immediate nitriding action and eliminates passive surfaces

Another Look at Nitriding

NITRIDING can be done on a wider variety of steels than was thought possible a few years ago. It has become one of the most important ways for creating hard, wear-resistant surfaces.

Elements that combine readily with nitrogen are about the same as those which combine with carbon. The exception is aluminum, the most powerful nitride forming element known, which will not combine with carbon.

Elements—Chromium, molybdenum, titanium, tungsten and vanadium combine with nitrogen. Manganese is capable of forming both nitrides and carbides, although it is of lesser importance as a nitride former. Any steel to be nitrided must contain some of at least one and preferably more than one of these nitriding elements. Aluminum is not necessary; it is possible to get higher hardness values with no aluminum present.

Aluminum is used for two reasons: 1. It is known to be the most powerful nitride former; about 1 per cent of the element provides an economical way to get sufficient "nitridability" for maximum hardness values. 2. If maximum results are required, the aluminum-bearing steels usually are cheaper than those which contain greater percentages of other nitride forming elements.

Carbon—An important factor in considering steels which are suitable for nitriding is the carbon content. An appreciable carbon content usually is required to get suitable core properties and promote stabilization in the alloy, but too much carbon tends to tie up the alloying elements so they are not available to form the alloy nitrides.

In a few cases, alloy steels with higher carbon percentages are nitrided, but, in general, steels containing about 0.25 to 0.50 per cent carbon exhibit the best nitriding properties.

Second Cousin—Nitriding can't be considered a conventional heat treatment. Temperatures are in the range of 1000°F. This is lower than the temperature of the phase change which is the governing factor in most heat treatment.

The nitride case as formed possesses its characteristic properties without any crystalline transformation which normally provides the hardness and strength in other types of heat treatment.

Two Stages—The nitriding action takes place in two stages. In the first, the steel is heated to a temperature at which the surface tends to become chemically active in an atmosphere of dissociated ammonia. The atomic nitrogen obtained by dissociating the inert ammonia gas reacts chemically with certain alloying elements in the steel surface, withdrawing them from their state of solid solution.

The second stage occurs in the form of a precipitation of the alloy nitrides which form a sort of keyed together structure not too unlike an aggregate of martensite needles found in fully hardened steel.

The nitride itself is inherently abrasion resistant, and the manner in which nature puts it together structurally provides the resistance to indentation which registers as hardness.

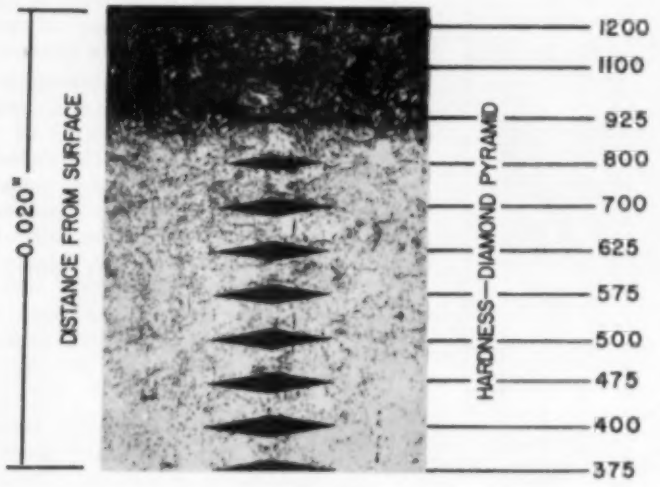


Fig. 2—Knoop indentation made at short intervals on a cross section shows true hardness pattern

Evolution—There has been a marked tendency toward decreasing the length of the nitriding cycle. Two factors are mainly responsible: 1. The growing use of the process has proved that deeper cases obtained by the long cycles are not necessary for many engineering purposes. 2. Newer methods of testing have proved the true properties of nitrided cases. This has led engineers to revise specifications and take full advantage of the cost saving afforded by the shorter cycles.

The nitriding properties of various steels have been studied extensively. Metallurgists know what steels can be nitrided successfully and the properties which can be expected.

New Steels—An important contribution has been made by steelmakers. They have developed alloy steels that can be machined more readily, and have improved facilities for heat treating bars and forgings that produce structures suitable for nitriding without further treatment in the intermediate stages of manufacture.

Another important factor has been the more widespread knowledge of the favorable stress balance automatically provided by nitriding; this adds up to a marked increase of mechanical properties without regard to hardness requirements.

Processes—The main modification in the processing technique has been the tendency to adopt the two-step process over the more conventional one-step process. In the one-step process, the furnace (usually a retort type) is loaded and sealed and the air purged by flowing ammonia through the retort rapidly while temperature is kept constant at about 300°F.

When the exhaust gases show less than 10 per cent air, the temperature is brought rapidly to the nitriding level (about 975°F) and the ammonia adjusted to maintain about 25 per cent dissociation. Temperature and dissociation are held constant until the pre-established heating time has been completed and cooling cycle started.

Two-Step Process—In the one-step process, the ammonia gas is brought directly into the furnace and broken down into its components within the work chamber. The two-step process involves additional equipment and controls. The ammonia is dissociated in an external unit and fed into the work chamber. This provides a better control for ammonia dissociation.

Nitriding with the two-step process, commonly known as the Floe Process, is done by first conducting the normal cycle of temperature and dissociation for a short time, then increasing the temperature to 1050°F and the dissociation to about 80 to 85 per cent for the remainder of the cycle. In a 24-hour cycle, the normal 975°F with 15 to 25 per cent dissociation is carried on for 5 hours and then modified as above for the remaining 19 hours.

Advantages—The two-step process has some advantages, although the advisability of recommending it for all nitriding is questionable. It is possible to obtain a somewhat deeper case in a shorter time, but this gain is not great in an overall consideration. The main advantage is the minimization of the white layer.

The white layer is a brittle nitride concentrate which tends to form on the surface. It should be removed by grinding or lapping before the part is put into service. Careful control in the conventional process usually yields little white layer (about 0.001-in. thick). Test pieces must be studied before it can be determined whether the two-step process would be advantageous.

Saves Ammonia—The two-step process also saves ammonia. Using the lower dissociation for the entire cycle is wasteful. When dissociation is increased to about 80 per cent, most of it is being used. Where quantities of nitriding are being done, the cost saving is appreciable.

Disadvantages of the two-step process: 1. Increased cost of initial equipment. 2. Labor costs often enter the picture. In many plants it is a common practice to start up a nitriding furnace, bring the charge to temperature, then set all controls and leave the equipment unattended until ready for the cooling cycle. In the two-step process, someone has to attend the equipment when the second step is started. Automatic equipment has not been successful in changing temperature and dissociation to complete satisfaction.

Surface Conditions — During certain machining operations, steels develop a passive surface which may act as a complete barrier to the atomic nitrogen for

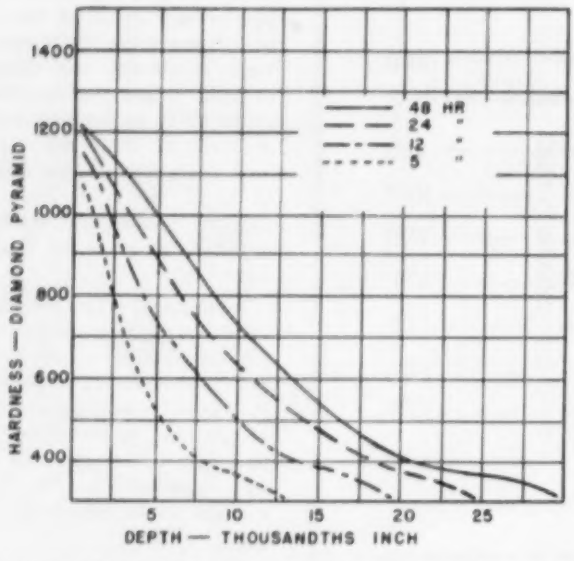


Fig. 3—Effect of time on case depth for specimens of aluminum-bearing nitriding steel AMS-6470

some time after nitriding should have started. On the longer cycles this is not often of great importance, but in cycles of 5 or 8 hours it may be the difference between success and failure.

A light etch by acid pickling will destroy this passive layer, but there always is the danger of overetching. A fine blast, such as the vapor blast method, is one way to impart a light etch to the surface, although you may lose dimensions in small precision parts.

Best Way—The easiest, cheapest, and most foolproof way is to use a light phosphate coating. Fig. 1 shows that it will destroy a passive surface. (The depth hardness chart has diamond pyramid hardness plotted on the vertical axis and depth from the surface plotted on the horizontal axis.)

To prove the existence of a passive surface, specimens of an aluminum-bearing nitriding steel were nitrided for 2½-hours. The solid line shows the hardness with reference to depth for ground and polished specimens which were subjected to a zinc-phosphate treatment. The dotted line in the lower left corner shows results of nitriding identical specimens which had not been surface treated—the nitriding action had just begun at the end of the nitriding period.

Such results can't be obtained every time because a passive layer does not always exist; in fact, many specimens were nitrided before this extreme difference was found. But it does prove the nonuniformity which can and does exist. The phosphate coating is highly recommended as a preliminary treatment for all parts which are to be nitrided and especially those which are to be subjected to the shorter cycles.

Hardness—Methods of evaluating the hardness of nitrided surfaces always have been controversial. The Superficial Rockwell, Vickers and other instruments generally have provided satisfactory results. Most hardness test data have been gathered by testing with the indenter at right angles to the case and step grinding to determine the hardness depth.

In recent years much has been learned about testing nitrided cases. All hardness tests reported in this article were made by a Tukon instrument with a Knoop indenter, using loads from 100 to 500 grams on cut and polished cross sections, so that the indentations were made parallel to the case.

Gaining in Use—This method is being adopted more universally because it reveals the true characteristics. It cannot be applied to testing parts, but one accurate hardness survey on a sectioned test coupon representing a furnace load of work is far more valuable than extensive testing of many parts by less accurate methods.

Fig. 2 is a photomicrograph showing the structure of a nitrided case from the edge (top of picture) to the core. The diamond-shaped marks are those made by the Knoop indenter. The marks are longer at the core, indicating the hardness decrease. Marks are less distinct through the case because the specimen has been etched to reveal the structure. Readings usually are taken on the unetched surface.

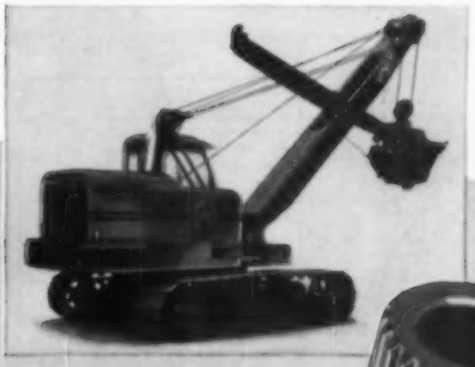
Indenters—The choice between the Vickers and Knoop indenters is a matter of opinion. The magnitude of loading and direction of the indentation are chief factors.

All test results in this article are given in diamond pyramid value with no attempt at conversion. This is done purposely because conversions are inclined to be inaccurate and grossly misleading. Anyone involved in nitriding should learn to think only in terms of diamond pyramid hardness and the hardness survey on the cross section.

Hardness Surveys—Fig. 3 shows hardness surveys made on specimens of identical steel (AMS-6470 —composition shown in Table I) nitrided by the standard one-step process. Not only does the hardness survey show true hardness conditions, but it shows clearly just how much of any surface may be removed in a final finishing operation without seriously impairing the case hardness.

Visual examinations of etched cross sections often are used for case measurement, but here again inaccuracies cause endless controversies. The difficulty: Where to stop measuring on an etched cross section.

Gradual Decrease—The hardness curves in Fig. 3 show the hardness decrease is gradual down to about 400 diamond pyramid. It becomes somewhat less steep and persistently shows some hardness for a somewhat greater depth. Diamond pyramid 300 is considered core hardness for these specimens. The region between 300 and 400



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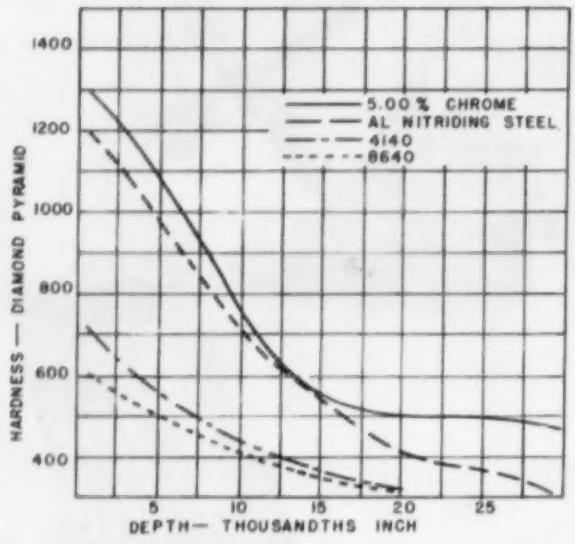

Fig. 4—Case depth and hardness obtained by nitriding four different alloy steels for 48 hours

often has been the subject of some controversy, so its properties were thoroughly explored.

This was done by taking strips of nitriding steel 1/16-in. thick and nitriding them for 5 hours. Then 0.0075-in. was removed from all surfaces, which, by the chart, reduced the hardness to a surface value of 400. The test strips were tested by bending in comparison with test strips which were identical in dimensions, but were not nitrided.

Results—They all took a 90-degree bend with no sign of surface cracking, although the nitrided strips required a greater force to produce the same degree of bend. Test results proved that the region below 400 diamond pyramid in hardness value, even though it contains some nitride, is tough and relatively ductile. For practical purposes, it may be considered as a part of the core rather than the case.

A hardness survey on a cross section can be done easily and quickly to get full information on the heat.

Applications dictate the initial hardness, case depth and allowable stock removal, but the conventional nitriding steels should yield surface hardness values in excess of 1000.

Stock Removal — As Fig. 3 shows, some stock could be spared for finishing without dropping below the 1000 value. It is suggested that 0.0025-in. maximum be removed from parts subjected to the 48-hour cycle, up to 0.0015-in. from the 24-hour cycle and about 0.001-in. maximum from work nitrided for 12 hours. In the 5-hour cycle the valuable portion of the case is too thin to permit any removal except what might be removed by light lapping or polishing.

True evaluation of nitrided cases largely has been responsible for the trend toward shorter cycles. Many engineering applications can be satisfied by these thin nitrided cases. This has helped make the process more competitive costwise with other surface hardening methods.

Nitriding Steels — Excluding stainless, the steels which can be most advantageously nitrided may be divided into three classes: 1. Medium carbon alloy tool steels and steels of the AISI 502 type. They generally produce the hardest cases, but are relatively expensive. 2. Aluminum-bearing steels especially designed for nitriding, such as AMS-6470. They yield excellent cases and cost much less than the higher alloy tool steels. 3. Medium carbon AISI steels containing combinations of chromium, molybdenum and vanadium, such as 4140 and 6150. This class is the least expensive, but does not provide either the extreme hardness or depth of the other types.

Comparison—Fig. 4 shows typical hardness patterns that may be expected from nitriding four different steels.

The tool steel (for composition see Table I) gave the hardest and deepest case, with the AMS-6470 running a close second. The tool steel had a higher core hardness from the preliminary heat treatment which accounts for the difference in the pattern at the lower end. The third curve shows a typical pattern for 4140 which had been heat treated to about 300 diamond pyramid.

Nickel-Bearing Steels—The lower curve shows average results from nitriding 8640. Although this type can be nitrided successfully, it is definitely inferior to the chrome-moly type. Nickel is not a nitride promoter, but whether its presence, even in small amounts, inhibits the action has been debatable. Test results suggest that it probably does. It seems logical that the nickel-bearing types usually should be avoided for nitriding.

The older and well known aluminum - bearing nitriding steel, AMS-6475, which contains about 3.25 per cent nickel still is used, but appreciable sacrifice is made in the case hardness compared with other aluminum bearing types. The cost of the steel and the increased difficulty in machining also have contributed toward its decrease in popularity. Its one virtue: Its rather unusual composition causes the core to age harden during the nitriding operation, providing a stronger foundation for the case.

Cast Steels—With the increased use of lost wax and other methods, more castings are being nitrided. Castings made from nitriding steels can be nitrided with limited success. Nitriding can be done with complete success only on a well dispersed or homogenized structure, such as that obtained by quenching and tempering, re-

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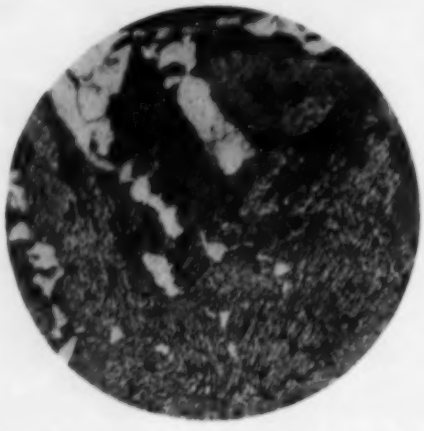

Fig. 5—Section of casting (X 100) made from AMS-6470. Note nonuniform case at top of picture and generally coarse structure

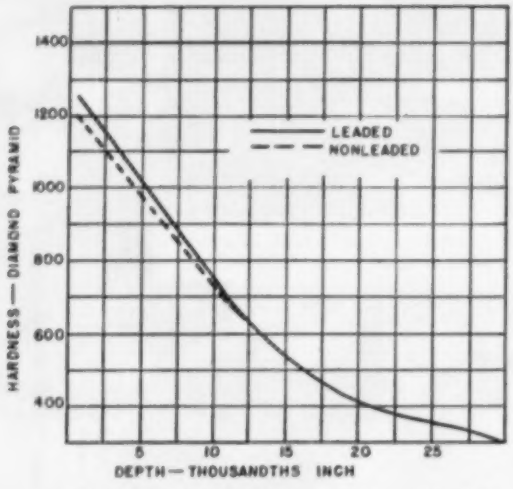

Fig. 6—Lead added for improved machinability has no detrimental effect on nitriding

gardless of composition.

Any cast structure defies these basic principles. Fig. 5 shows a cross section of a casting made from AMS-6470 and nitrided for 24 hours. The nonuniform case (top of picture) and the generally coarse core structure compares poorly with the structure shown in Fig. 2, which is the same alloy in the wrought condition.

Machinability — Nitriding steels are difficult to machine. Selenium and sulphur have been used with some success, but these elements detract appreciably from the mechanical properties of the steel. Graphitic nitriding steels also were attempted, but the difficulties involved prevented them from becoming commercially important.

The use of lead in alloy steels has the best answer offered for improved machinability without appreciable sacrifice of mechanical properties. Many alloy steels, including the aluminum-bearing nitriding steels, are available with about 0.25 per cent lead.

Effect on Properties—Lead has little effect on mechanical properties. Fig. 6 shows the hardness pattern through the case for standard AMS-6470 nitrided for 48 hours, and the same composition with lead added.

Although average results for the leaded steel were slightly higher, this is considered a normal variation from one heat of steel to another and should not be construed that lead increases the nitridability. Leaded alloy steels are catching on like "a grass fire" and nitriding is coming in for its full share of the cost reduction these steels bring.

Case Properties—Nitride cases resist wear, heat and many forms of corrosion; they do not deform appreciably in processing. These are well-known properties.

An outstanding advantage of nitride surfaces not generally known is that nitriding places the surface layers in a state of compression which is the most favorable stress condition. In recent years this knowledge has been put to work on a large scale.

Example — Regular 4140 steel heat treated to about Brinell 300 showed an endurance limit of 70,000 psi. Test bars which were identical but were nitrided for 24 hours showed endurance limit values of 95,000 to 105,000 psi.

Nitriding also decreases notch sensitivity of members in repeated stress. The same heat treated 4140 steel which showed an endurance limit of 70,000 psi, dropped to 19,000 psi when notched with a 0.005-in. radius at the bottom of the notch. Nitriding these notched specimens brought this endurance limit back up to about 40,000 psi.

Whether or not the hard surfaces are required, nitriding can play an important role in providing greater strength without increasing the volume of material.

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Table 1—Composition of specimen steels

Type Steel	Carbon	Manganese	Nickel	Chrome	Molybdenum	Tungsten	Aluminum
5.00% Cr Tool Steel	0.38	0.32	——	4.80	1.35	1.05	——
AMS-6470	0.40	0.55	——	1.62	0.35	——	1.08
4140	0.41	0.85	——	1.05	0.23	——	——
8640	0.39	0.90	0.55	0.62	0.22	——	——

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

STRAIGHT-LINE PRODUCTION ON THE ROOF

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Above is the 700-Foot Long Self-Housed Finishing System Planned, Engineered and Built by Mahon on the Roof of the Whirlpool-Seeger Corporation's Marion Division Plant, Marion, Ohio. Much of the housing in this installation is an integral part of the Finishing Equipment.

Mahon Seven-Stage Metal Cleaning and Rust Proofing Machine installed in the Self-Housed Mahon Finishing System illustrated above. Ample space is provided for attendant on operating side.

Mahon Oven Control Cabinet, which houses Temperature Recorder, Air Flow Switches and other Safety Control Devices, is shown at left. Mahon Oven Heating Unit appears in foreground.

Pinched for Space Inside? . . . there's

LOTS of SPACE ON THE ROOF!

Here's a typical example of straight-line finishing production unfettered by restrictions normally encountered inside manufacturing plants. This Finishing System was planned, engineered and built by Mahon on the roof of the Whirlpool-Seegar Corporation's Marion Division Plant, Marion, Ohio . . . it was built on the roof because suitable space inside the plant was not available. In the 700-foot long enclosure, which is permanent construction, are housed a Seven-Stage Metal Cleaning and Rust Proofing Machine, a Dry-Off Oven, a Cooling Tunnel, a Flow-Coater and Vapor Conditioning Chamber, Reinforcing Booth and Filtered Air Supply System. The Finish Baking Oven, which was already in place, was rebuilt by Mahon with three new Heating Systems. This is a Mahon solution of a problem confronting one manufacturer. If you have a finishing problem, or are contemplating new finishing equipment—for either Electrostatic Coating, Spray Painting, Flow-Coating or Dip-Coating—you, too, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements. No matter what your finishing job may be, you'll find that Mahon equipment will serve you better . . . because, Mahon equipment is engineered better and built better for more economical operation over a longer period of time. You can rely on Mahon to do the complete job on one contract—undivided responsibility for the entire system insures proper coordination, and safeguards you against complications which may upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, for information, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

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Consider the warehouse of your Reynolds Distributor as your own. His inventory of aluminum wire, rod, bar and screw machine stock conveniently provides the material you need—for regular shipments and emergency requirements. Your Reynolds Distributor is right next door with the aluminum you need *when* you need it. His staff is Reynolds-trained to give you valuable assistance in alloy selection, fabrication techniques and application advantages.

Reynolds Metals Company, Louisville 1, Kentucky.

Call your nearest Reynolds Distributor, listed under Aluminum in your classified telephone directory, for his stock list and assistance on your problems.

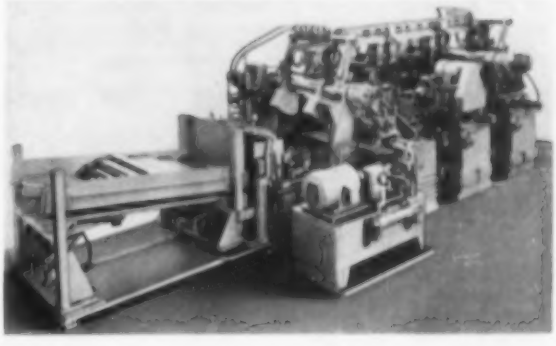
Automated Boring Machine Flares, Faces, Chamfers and Bores

This five-station, in-line transfer unit machines 414 automotive steering columns an hour.

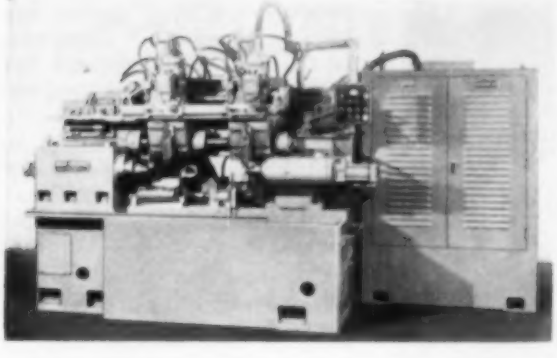
The hopper feed has an air-powered mechanism that feeds two tubes at a time to an overhead transfer bar arrangement.

Adjustments to the machining heads and hopper feed permit the handling of tubes 32, 33 and 34 in. long and 1½-in. in diameter.

The three machining stations have identical cast wing bases. A screw chip conveyor trough is cast in the machine base. *Write*: Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327



Lathe Has Longitudinal Turning Slide Mounted to Top Bed



The Reedmatic is tooled for short run or high production turning—with or without automation.

With clockwise spindle rotation, thrust of the turning tools is down and toward the top bed. Thrust also is down on the rear slide. Any lifting action on the turning or facing slides is eliminated, along with the need for upside-down tools.

A 30-hp model has an 18-in. swing over the carriage ways and 12 in. over the cross-slide ways. The 60-hp model has a 24-in. swing over the carriage ways and a 16-in. swing over the cross-slide ways. *Write*: Reed-Prentice Corp., Worcester 4, Mass. *Phone*: Pleasant 6-6261

Automatic Press Unloader Increases Production

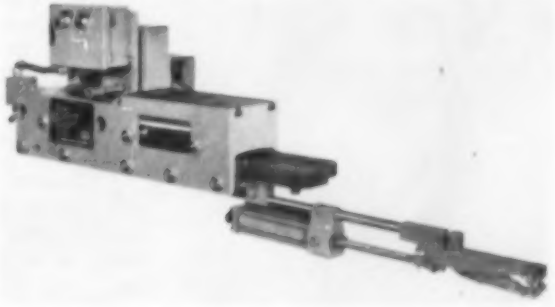
No floor structure is needed. The assembly is contained in a compact, durable casting which is mounted on the press.

The unloader is synchronized with the press through a limit switch. Two air cylinders operate the unloader. The main cylinder is the lift cylinder; another cylinder opens and closes the jaws.

When the press signals that it is clear for unloading, the jaw cylinder moves the open jaw forward. At the end of the forward stroke, the jaw grips the part.

At this point, the main cylinder retracts, lifts the stamping out of the die and swings it clear of the press. The jaw cylinder retracts, unclamps the part on a table or conveyor and trips a limit switch. The main cylinder returns to its normal waiting position.

Press unloaders come in five sizes. Jaw widths

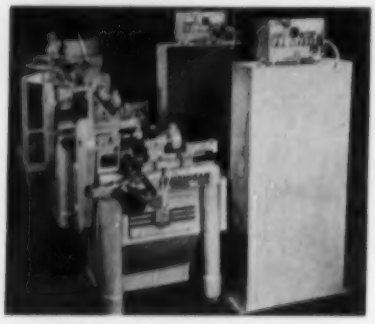


are adjustable for different width parts. Jaws are adjustable for different loading heights and for the angle of travel into the die. *Write*: Sesco Inc., 8881 Central Ave., Detroit 4, Mich. *Phone*: Texas 4-1701

NEW PRODUCTS and equipment

Gear Tester

Model 1126 gear speeders test transmission gears automatically. With electronic audio inspection of gears you no longer have to depend on an operator's sense of hearing. No extra time is needed to test marginal gears.



If noise is excessive in any frequency band, rejection is positive and quick. Spur and helical gears can be tested singly or in a cluster. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Conveyor Trolley

Easier installation, adjustment and maintenance are featured by the redesigned trolley for cable conveyor systems. Interchangeable wheels of three different load-bearing capacities are used as required.

Side plates are one piece of 11-gage pressed steel. They fit over the drive lug that secures the trolley to the cable and are held together by two bolts.

Stud or pendant attachments are suspended by single bolts through holes at the bottom of the side plates. The attachments can be put on, taken off or adjusted without disturbing the trolley assembly. *Write*: Tipp Mfg. Co., Tipp City, O.

Pin-Type Arbors

Precision machining of splined bore gear blanks is speeded by this arbor. It has regularly spaced pins around its body. When a gear blank is loaded on the arbor, the pins fit into the internal splined bore.

When the gear blank is rotated, the pins move up ramp-type cams and are forced into line contact with adjacent splines near the pitch line. This locks the part firmly to the arbor because the pins apply equal force all around the splined bore to eliminate play.

Thrust from turning or grinding operations keeps the part from loosening. *Write*: Frank G. Hough Co., Libertyville, Ill. *Phone*: 2-4000

Battery Trays

All-steel battery trays are available for 64 models of the Exide motive power batteries. The trays range in width from 6⅝ to 18¼-in.

The covers can be hinged at either the front or back of the tray. Ends, sides and covers of the trays are free of projections.

The trays are built for 12, 18 and 24-volt hand truck batteries. *Write*: Exide Industrial Division, Electric Storage Battery Co., Philadelphia, Pa. *Phone*: Locust 4-4030

Barrel Finishing

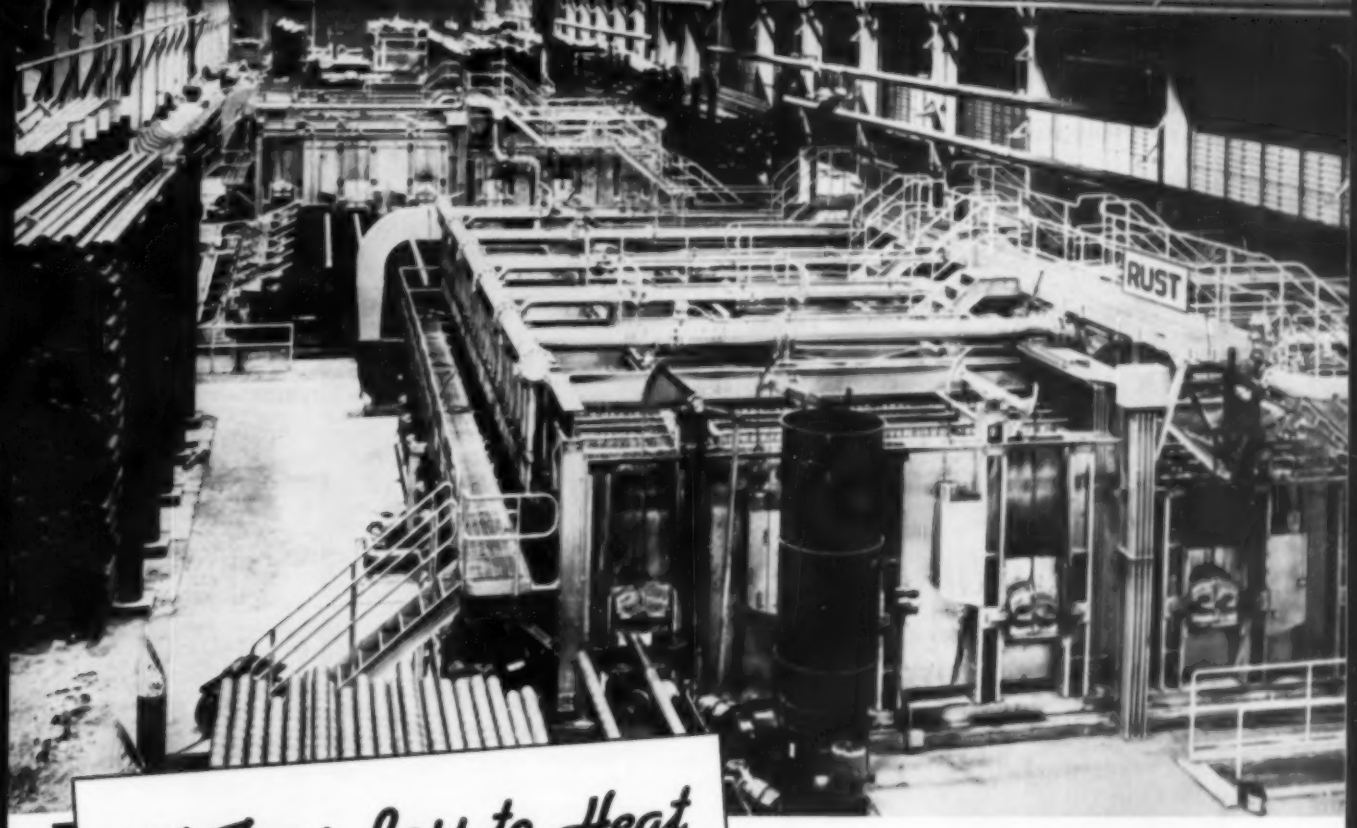
FM 186 is a liquid alkaline burnishing compound for brightening the finish of zinc diecastings. It's also used for burnishing steel and copper and its alloys.

The compound may be used for self-tumbling or with shot or synthetic media. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

Double End Machines

This line of automatic, high-speed machines does either press forming or metal removing on both ends of rod or tubular parts from 1 to 24 ft long and up to 6 in. in diameter.

Production rates range from 300 to 5000 pieces an hour. Without the motorized heads turning, the machine can be operated like a forming press that will expand, reduce, flare or bead both ends of



116 Tons Less to Heat in this roof

because of B&W Insulating Firebrick suspended construction

Here's another case where light weight means lower cost. The roof of this walking beam furnace is 2,320 square feet. B&W Insulating Firebrick suspended construction for a 9-inch roof weighs about 30 lbs per square foot, including the weight of rods, hangers, pipe, brick and mortar. This is approximately 100 lbs per square foot less than an arch constructed of heavy firebrick plus insulation having the same heat flow. *This saving means the B&W IFB roof is 116 tons lighter.*

The new walking beam furnace (shown in photograph above) was designed and constructed by Rust Furnace Company for Jones & Laughlin Steel Corporation. Seamless pipe is conveyed into the furnace, moves slowly from left to right on walking beam rails designed and furnished by York-Gillespie Mfg. Co., and passes out the exit door.

Here are the money-saving benefits of B&W suspended construction:

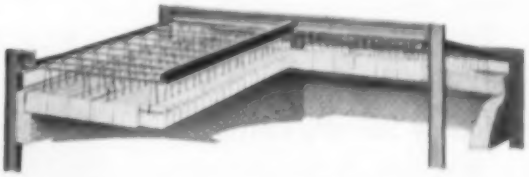
1. Supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special castings.

2. B&W Insulating Firebrick heat up and cool down faster. This means lower fuel costs, faster inspection.

3. Furnace temperatures can be changed quickly. When different steels call for different heating schedules, the furnace temperature can be adjusted in minutes instead of hours.

4. Installation costs are lower because these lightweight brick can be handled faster and easier than ordinary heavy firebrick.

For complete information on B&W IFB—the *lightest* weight insulating firebrick, write to B&W today or call your local Refractories Engineer.



This is a cross-sectional drawing of a typical suspended arch arrangement using B&W Insulating Firebrick. It can be used in flat or sloping roofs, nose arches and many other types of suspended furnace construction.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

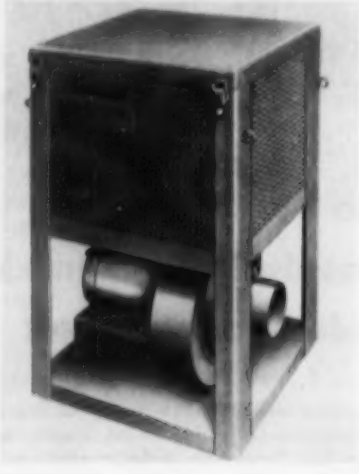
R 800

the parts simultaneously.

With the heads turning, the machines will burr, chamfer, face, spin, drill, bore or ream both ends simultaneously. *Write*: Walter P. Hill Inc., 22183 Telegraph Rd., Detroit 19, Mich. *Phone*: Kenwood 4-9190

Mist Collector

Fog, smog and mist from grinders, lathes, screw machines and other machine tools using cutting oils are captured by the MistKolector. It provides cleaner air, a cleaner p'ant and a reduction of fire hazard.



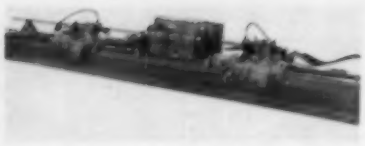
The machine comes in two models and four motor sizes. Motors from ½ to 5 hp power air intake of 525 to 2685 cfm. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: 5-7151

Hollow Spindle Lathe

This large double-end lathe is for profile boring and facing of compressor shafts of jet engines.

The 32-in. lathe has a one-piece, 38-ft bed with a carriage on both ends of the headstock. On each carriage is a 24-in. hexagon turret mounted on 45-degree roller bearing angular slides.

Complete machining of intricate profiles of the bore and facing of both ends are done at one setting



with universal chucks on both ends of the spindle. In the center of the spindle a hydraulically operated work support prevents any deflection of the workpiece between the two outer chucks. *Write*: Lehmann-Brandes Machine Co., Chouteau & Grand Blvd., St. Louis 3, Mo. *Phone*: Prospect 1-4066

Fans

Series 300 incorporates the high efficiency of airfoil-type blading for air exhaust or supply in chemical, ceramic, foundry and industrial finishing applications.

Aerodynamic guide vanes, inlet and outlet cones, wheel caps and belt guards are streamlined to capitalize on the polyfoil-type blading and keep air flow turbulence to a minimum.

There are 14 fan sizes. Volumes range from 1700 to 100,000 cfm. *Write*: Department 143, Sturtevant Division, Westinghouse Electric Corp., 200 Readville St., Hyde Park, Boston 30, Mass.

Rotary Head

This motor driven rotary head can also be used for manual indexing. Work can be positioned on a grinding machine table and rotated by the unit.

The head is equipped with collets ranging from ¼ to 1 in. and

with an interchangeable 4-in. three-jaw chuck. A 24-step plate and stop pin are used for index positioning.

The motor rotates the spindle at about 250 rpm. Motor and spindle are mounted on a common base for use vertically or horizontally. *Write*: Multiplex Co., 1536 Getty St., Muskegon, Mich.

Contour Grinder

The Master Profiler and contour grinder removes metal quickly on steel punch or heavy press die sections.

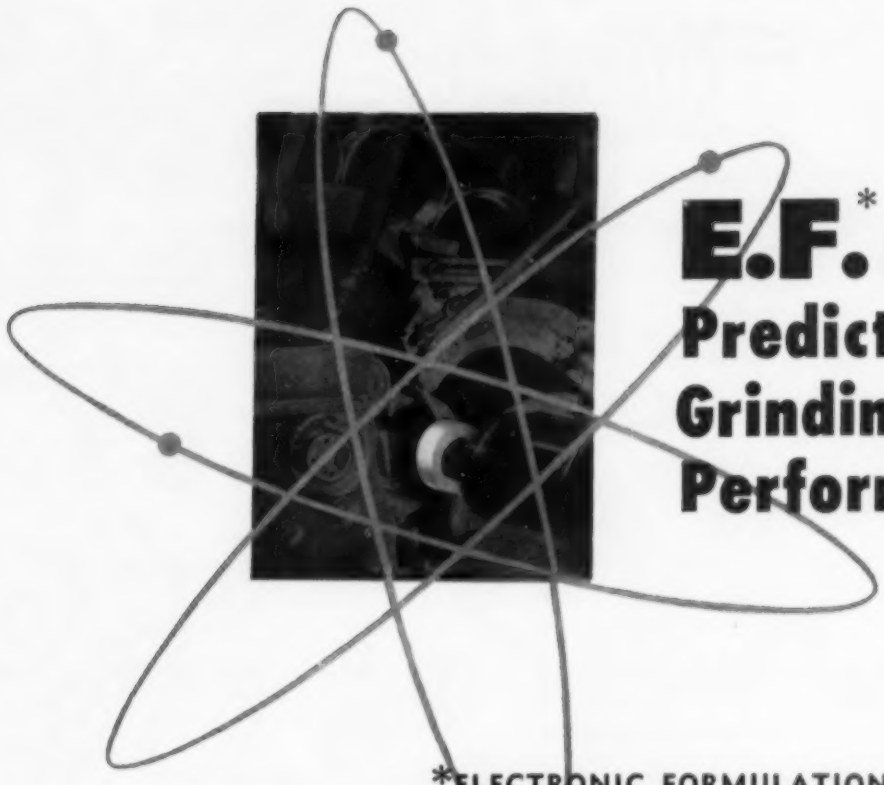
The machine gives accurate and speedy free-hand rough and finish profiling.

Mounting for the grinding wheel is a spindle supported by a heavy column and overarm. Wheels range up to 6 in. in diameter and 4 in. high. The operator controls the oscillation of the wheel which can be tilted up to 5 degrees. *Write*: Kindt-Collins Co., 12651 Elmwood Ave., Cleveland, O. *Phone*: Academy 1-0800

Degreaser

The OP3 degreaser cleans parts that have a tendency to nest or pack, or parts with recesses that are difficult to penetrate with a hand spray.

The cleaning cycle is based on a consecutive boiling solvent, warm liquid and vapor dip. Both trichlorethylene and perchlorethylene are recommended for the machine. *Write*: Circo Equipment Co., 51 Terminal Ave., Clark (Rahway), N. J. *Phone*: Fulton 8-8600



E.F.* Lets You Predict Grinding Wheel Performance!

***ELECTRONIC FORMULATION** is a new, fundamental manufacturing system. It has established the most accurate standards and techniques by which grinding wheels can be specified, produced, and reproduced. Its new precision applies to all types of grinding wheels as well as to other abrasive products.

Designed and Developed to take full advantage of modern electronic equipment, the "EF" system determines the precise amount of each ingredient. It does this rapidly and flawlessly. The results form a dependable basis for rigid manufacturing control, and are automatically retained on punched cards.

For Your Production Grinding, this means an entirely new degree of dependability, in three important ways. First, original "specs" can be more accurately pin-pointed for your work. Second, "EF" wheels can be more precisely manufactured to match these "specs". Third, replacement wheels can be much more nearly identical in cutting characteristics. "EF" lets you *predict* grinding wheel performance, the key factor in controlling your production grinding to match your production needs.

Ask your local BAY STATE DISTRIBUTOR about these important **"EF"** *advantages.*

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WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass., U. S. A.
Branch Offices and Warehouses — Bristol, Conn.; Chicago, Cleveland, Detroit, Pittsburgh. Distributors — All principal cities.
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

PROTECT WORKERS

Cut glove costs with JOMAC HAND GUARDS

Here's rugged, common-sense protection for your workers, real economy for you. Jomac Hand Guards armor bare hands, stretch glove life when worn over gloves. Widely used in the automotive field, they're practical in scores of industries—for handling raw materials, parts and finished goods, castings, forgings, sheet steel and sheet metal assemblies. They are interchangeable—can be worn on either hand—are made of durable, springy 32 oz. Jomac Cloth. They offer clear-cut *proof that quality means economy.*

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Jomac manufactures all types of hand and forearm protection – all made from famous loop-pile Jomac Cloth. Get complete details. Write for new Jomac Industrial Work Gloves Catalog. Jomac Inc., Dept. E, Phila. 38, Pa.

JOMAC
INDUSTRIAL WORK GLOVES

Plants in Philadelphia, Pa., and Warsaw, Ind.
In Canada: Safety Supply Co., Toronto

NEW literature

Write directly to the company for a copy

Hydraulic Oil Coolers

Air and water coolers for industrial hydraulic systems are covered in bulletin 55-69, 8 pages. Vickers Inc., Box 302, Detroit 32, Mich.

Anodized Aluminum

Specifications of continuously anodized and dyed aluminum strip in coils are given in a 4-page bulletin. Fromson Orban Co. Inc., 261 Madison Ave., New York 16, N. Y.

Surface Grinder

An 8-page bulletin describes a hand feed, precision surface grinder. Abrasive Machine Tool Co., East Providence, R. I.

Drilling, Boring

A machine for production center-drilling, drilling and boring is described in a 4-page bulletin. Canton Tool Mfg. Co., East Canton, O.

Castable Refractories

Advantages of 23 grades of castable refractories are charted in a catalog. Plibrico Co., 1800 Kingsbury St., Chicago 14, Ill.

Centrifugal Pumps

Bulletin 7223-B, 20 pages, illustrates a line of cradle-mounted pumps with capacities from 5 to 2800 gpm and total head pressures from 10 to 525 ft. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Preload Indicator

An indicating washer that permits accurate preloading to 80 per cent of bolt yield strength is described in a 12-page bulletin. Standard Pressed Steel Co., Jenkintown, Pa.

Silver Plating

A bright silver plating process that gives hard and ductile deposits is presented in an 8-page bulletin. Sel-Rex Precious Metals Inc., 229 Main St., Belleville 9, N. J.

Thermostat Bimetal

Bulletin A-401, 6 pages, gives engineering data on a bimetal with an optimum range of 200 to 600°F. Industrial Division, American Silver Co., 36-07 Prince St., Flushing 54, N. Y.

Automated Speed Control

Systems for automated speed control for use with a variable speed drive are described in bulletin C-100, 4 pages. Graham Transmissions Inc., Menomonee Falls, Wis.

Constant Delivery Pumps

Bulletin 46000, 8 pages, lists speeds, capacities and pressure ratings of 21 sizes of constant displacement radial piston pumps. Oilgear Co., 1593C W. Pierce St., Milwaukee 4, Wis.

Electric Motors

A line of electric motors from ¼ to 250 hp is presented in bulletin 1878, 8 pages. U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, Calif.

Refractory Mortar

Bulletin 610, 2 pages, tells you how to use a sillimanite base mortar. J. H. France Refractories Co., 1944 France Rd., Snow Shoe, Pa.

Spectroscopic Electrodes

Bulletin A-4004, 16 pages, lists preformed spectroscopic electrodes and powders. National Carbon Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Dust Collector

A 12-page bulletin explains a multiple tube dust collector. Research-Cottrell Inc., Bound Brook, N. J.

NEW BOOKS

Resistance Welding, Resistance Welding Committee, American Welding Society, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 163 pages, $4.50.

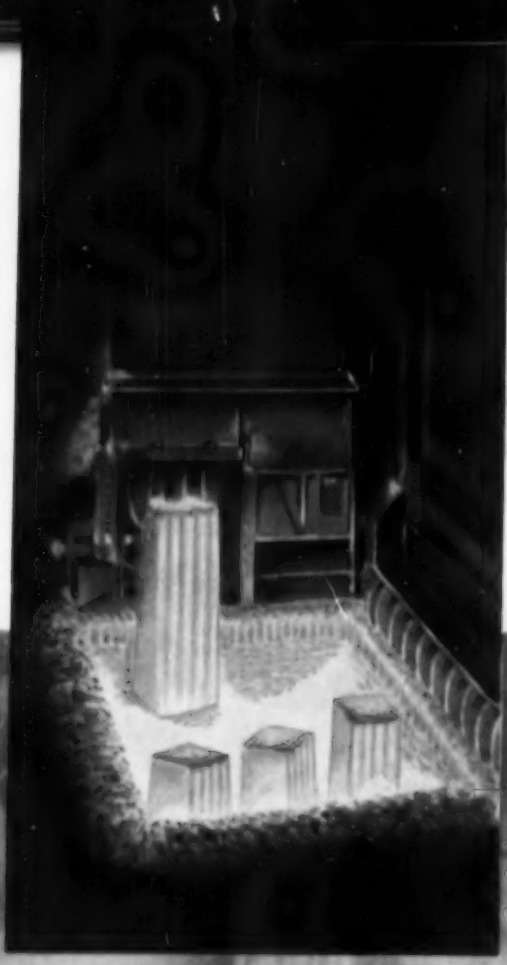
Theory and use of resistance welding are covered in this well-illustrated book. Full details are given of all six resistance-welding processes; machines, controls and electrodes; welding of different metals; and weld quality, inspection and testing.

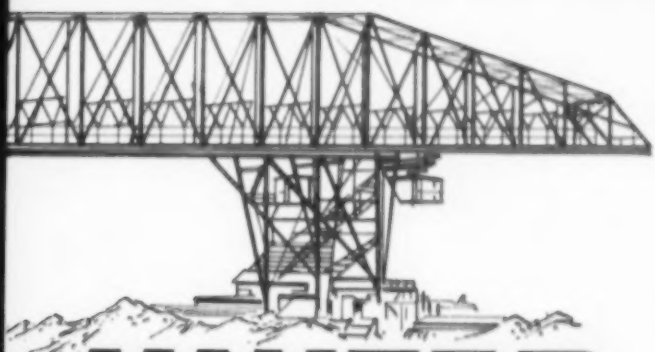
Chromium, Volume 1, edited by Marvin J. Udy, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 433 pages, $11.

The chemistry of chromium and its compounds is presented in this volume, No. 132 in the American Chemical Society's monograph series.

Handbook of Welded Steel Tubing, Formed Steel Tube Institute Inc., 850-52 Hanna Bldg., Cleveland 15, O. 267 pages, $10.

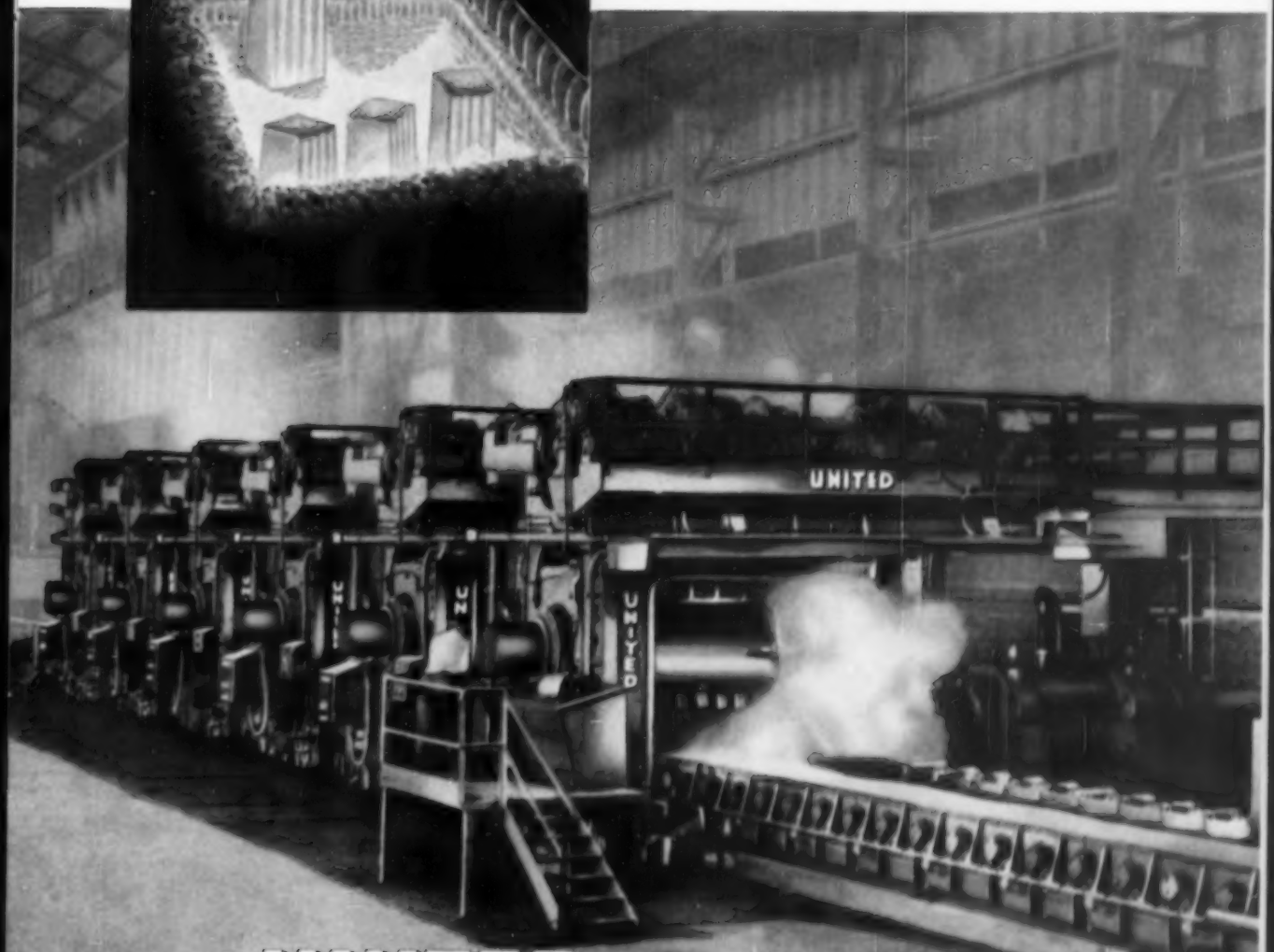
Two sections, one on carbon steel, the other on stainless give information on tubing manufacture, specifications and uses. Design data are included.





UNITED®

6-STAND 4-HIGH HOT STRIP MILL



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Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington (Lobdell United Division)

SUBSIDIARIES: Adamson United Company, Akron, Ohio
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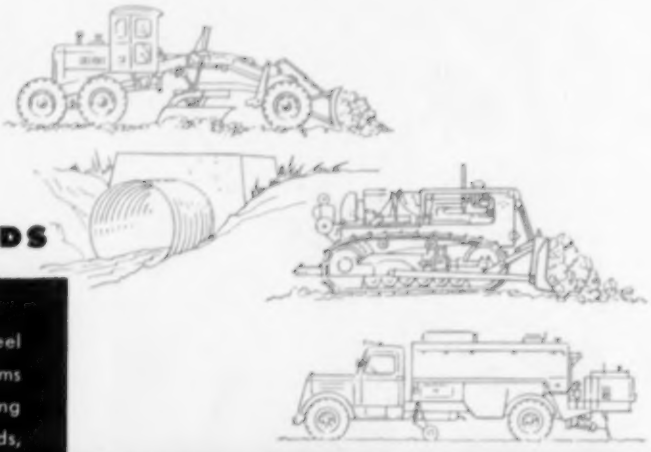
Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Modular Iron and Steel Castings and Weldments.

Newport Steel

HELPS BUILD ROADS



Substantial tonnages of Newport steel products go into equipment that performs road building miracles under grueling conditions. In many instances these roads, which must withstand the pounding of incessant traffic, are drained by culverts made by Newport Steel. Yet these are but indications of the versatility of the Newport products listed below. Conveniently situated in the heart of America's greatest industrial growth, this 70-year-old company employs highly skilled steelmakers and the most modern facilities to produce fine steels to the exact specifications of leading industries.

PRODUCTS OF
NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Eave Trough and Conductor Pipe
Culverts

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

STEEL

August 20, 1956

Market Outlook

ALMOST everybody is adjusting prices. Most of the changes are upward.

The steel industry—first to make the move—is rounding out its price job stemming from the new wage contract. Some of these adjustments, however, are downward. The decreases are being made by unstruck companies which had raised prices above those ultimately announced by U. S. Steel Corp. These adjustments pulled STEEL's price composite on finished steel down to $137.59 a net ton, compared with $138.50 in the preceding week. The composite now is $8.61 a ton (6.7 per cent) higher than it was before the strike. U. S. Steel said its markups average $8.50 a ton, or 6.25 per cent.

ALUMINUM UP—The aluminum industry hoisted pig prices 1 cent a pound, or 4.2 per cent. This increase, which fans out also to finished products, is the second one this year, a 1.5 cent advance having been posted in March.

Magnesium pig is up 1.5 cents a pound, or 4.4 per cent. Wrought products are up an average of 5 per cent. This is the second increase this year for magnesium. April brought a 1.25 cent advance.

COKE CLIMBS—Metallurgical coke producers are upping prices $2 a net ton, 7.5 per cent.

New prices of steel drums and pails are up an average of 10 per cent; rigid conduit climbed 5 to 7.7 per cent; rivets, 8 per cent; and belting, 2.5 to 5 per cent.

SCRAP SETS RECORD—Soaring scrap prices catapulted STEEL's price composite on steelmaking grades to a new high—$56.67 a gross ton. The previous record was $55.33 at the end of April. A week ago, the composite was $54.83. Not only does prospective domestic demand exert an inflationary influence on scrap, but so does export demand. Some people estimate that scrap exports from the U. S. this year will exceed those of 1955.

Not only are prices of material rising, but it soon may cost more to get it to your plant. Eastern railroads are planning to ask permission to raise their freight rates 5 to 10 per cent.

PRODUCTION GAINS—Steel production continues to recover from the strike period. In the week ended Aug. 19, output of steel for ingots and castings jumped 34.5 points and reached 87 per cent of capacity.

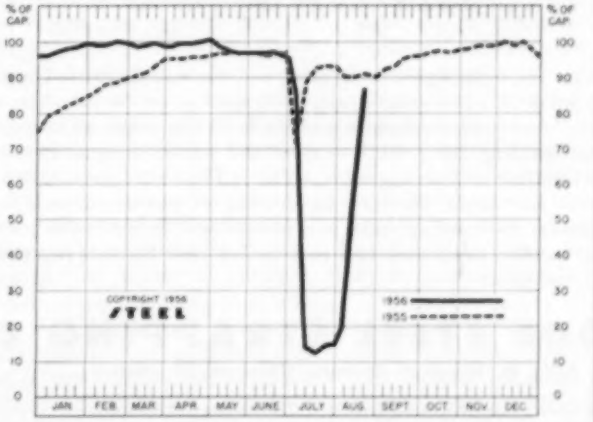
Production at as high rates as possible is assured the steel industry for the rest of the year. Order books show that.

To obtain the number of men needed for a high rate of steel production, Inland Steel Co., Chicago, is planning an intensive recruiting program for the coming month.

SURPRISE—Sheet consumers, recalling the downtrend in sheet demand prior to the strike and their rising inventories of that product, are a bit surprised to find sheet producers as well booked as they are. Sheet consumers also are finding that their sheet supplies are shrinking at a fairly rapid pace. To wind up work on 1956 models, auto makers are seeking tonnage originally scheduled for their 1957 cars.

PINCHED—Companies using plates and structurals find their supply position even tighter than it was. The steelworkers' strike cut them out of six weeks of supplies.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Aug. 19	Change	Same Week 1955	Same Week 1954
Pittsburgh	90	+37*	94.5	61
Chicago	86	+29*	96	65
Mid-Atlantic	94	+16	93.5	59
Youngstown	90	+40	100	64
Wheeling	96	+23	97	78
Cleveland	102.5	+42	100	57
Buffalo	92.5	+37.5	105	56
Birmingham	73	+58	60	62
New England	90	+16	87	52
Cincinnati	89.5	+12.5	94.5	51.5
St. Louis	102	+ 6	96	51.5
Detroit	74	+31	87.5	57
Western	78	+48	101	82
National Rate	87	+34.5	91	63

INGOT PRODUCTION‡

	Week Ended Aug. 19	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	131.1†	88.1	23.5	135.5
NET TONS (In thousands)	2,106†	1,415	377	2,176

*Change from preceding week's revised rate †Estimated. ‡Amer. Iron & Steel Institute

Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 67 Technical Outlook—p. 115

Real tension on this job!

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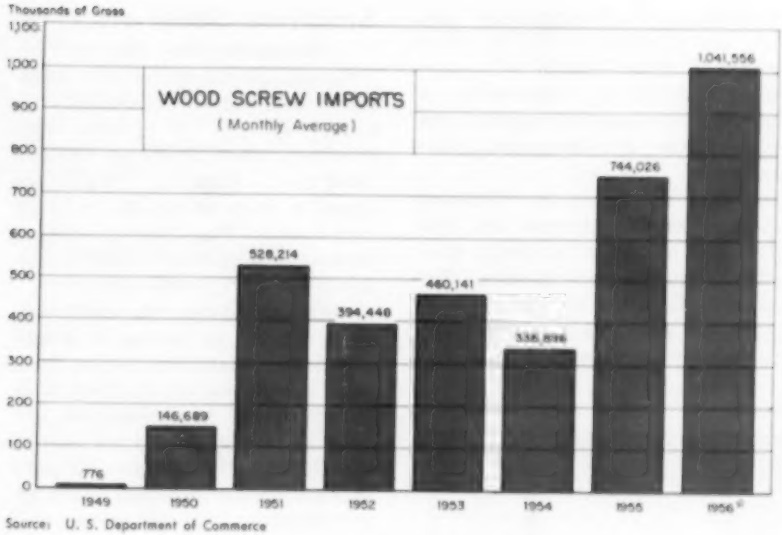

Source: U. S. Department of Commerce

Fastener Imports Rise

Industry group says quota system needed to protect domestic producers from products made by cheap foreign labor. Current campaign aims to enforce tariff rates on capscrews

"SOME of our people are afraid our industry is going to become like the bicycle industry."

That's a spokesman for a midwest wood screw company talking about increasing imports of cheap-labor fasteners. And he may be uncomfortably close to the truth, if the chart at the top of the page is any indication of things to come.

While the biggest threat is to wood screw makers, it applies in some degree to all manufacturers of bolts, nuts and screws. It wouldn't be so bad if American producers could campaign against these imports on a quality basis. But most of them realize that in recent years the quality of imported fasteners has been nearly as good as for domestic goods. Some large manufacturers making precision products shy away from imports, notably Japanese, because they cannot be assured of top quality. But for the most part, it doesn't make much difference.

Different Tactics—So the domestic industry is taking a different approach to the problem. It is trying to make sure that importers pay the proper custom duties and trying to get them raised to offset the cheap labor abroad. Japanese wage rates in this industry are 18 to 20 cents an hour; in West Germany they are between 59 and 69 cents an hour. Compare that with about $2 an hour in the U. S., and you can see why an importer can afford to buy Japanese goods even though they have to be shipped thousands of miles through the Panama Canal to the east coast.

As American wages rise, it will put the domestic producer at an even greater disadvantage and imports will increase. Reports are that there is enough foreign capacity to take full advantage of an increasing U. S. market. "And much of that capacity has been paid for by American dollars," bitterly claims one capscrew spokesman.

Clamping Down — The current campaign of the United States Cap Screw Service Bureau, New York, is to enforce tariff laws even though the bureau claims they are not adequate to protect American producers. There is before the U. S. Customs Court a case (John V. Carr & Son Inc. vs. the U. S.) which will determine whether hex head capscrews will carry a rate of ½-cent a pound for bolts or the higher rate of 22½-per cent ad valorem (according to value) for screws. Some importers have been labeling these screws as bolts to get the lower rate.

Members of the bureau are gathering evidence to support the government's contention that hex head capscrews are in fact screws and not bolts. They will present their arguments before the court in New York on Oct. 8. "If the government is successful in sustaining its previous ruling," says George P. Byrne Jr., legal counsel for the bureau, "it will be of some help. But it won't begin to narrow the wide differential in wage rates. The only thing that will really help is a quota allowing foreign producers a certain percentage of this market but still protecting domestic producers." The request for a quota of 2.8 million gross a year for wood screws was turned down by the White House in January, 1955, because of the administration's over-all policy of freer foreign trade.

Protection—"A good point to remember is that if a war were to cut off these imports, our domestic industry would be in such a run-down condition it couldn't fill the gap. Not only is there a complete lack of expansion in this domestic industry today, but capacity is standing idle and growing obsolete," says Mr. Byrne.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 164 & 165

The scramble is on for hot and cold-rolled sheets as producers open their books for the fourth quarter. Most mills can accept little new tonnage for delivery before mid-November.

Hot-rolled sheet inventories are generally low, while stocks of cold-finished sheet are more plentiful. Consumers are surprised to find their own inventories not holding up as well as they expected. Most consumers aren't pressed but they are becoming concerned.

Auto makers are seeking tonnage originally scheduled for 1957 models to wind up work on 1956 models. Incoming orders are not heavy, because auto makers have not committed themselves on the size of their late fourth quarter demand. Both the auto and appliance industries are expected to make a heavy demand on cold-

rolled sheets in November and December.

Activity is good in galvanized sheets, enameling stock and most other specialties.

A major supplier of strip has begun to allocate hot rolled, as was necessary earlier this year. Use of strip is below second quarter levels, but backlogs of unfilled orders are high.

Northeastern Steel Corp., Bridgeport, Conn., will make its final shipments of hot-rolled strip early in September. Production of carbon and alloy grades will stop this month. After delays in equipment installation, Northeastern is booking cold-finished carbon and alloy bars for shipment next month.

Corps of Engineers, Chicago, has received estimates on 1640 tons of nail-less flat edge steel strapping; Raritan Arsenal, Metuchen, N. J., has estimates on 625 tons of annealed hot and cold-rolled carbon sheets.

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Stainless Steel . . .

Stainless Steel Prices, Page 167

Pittsburgh—Stainless steel sales are limited only by availability of nickel, says W. B. Pierce, vice president, sales, Allegheny Ludlum Steel Corp. He adds: Production should be back to capacity in about two weeks. The firm is working on backlogs equal to about two or three months' production.

Although there was some advance buying by customers before the strike, Allegheny Ludlum feels that inventories of stainless steel in customers' hands are not too high in view of their high rate of operations. Warehouse supplies of stainless are reported to be below normal.

Tool Steel . . .

Tool Steel Prices, Page 167

Pittsburgh — Crucible Steel Co. of America increased prices on high speed and tool steel Aug. 10. High speed cutting steel base prices were increased 8 cents per pound while extras went up 8 per cent. High carbon-high chrome and tungsten hot work steels were increased 8 per cent on base and extras. All other carbon and alloy tool steels were increased 5 per cent on base and extras.

Latrobe Steel Co., Latrobe, Pa., increased prices Aug. 14. Other firms planned similar increases.

Only two producers halted operations during the strike. As a result, stocks of tool steel are not far from normal, and a normal sales situation is predicted for September and fourth quarter.

Plates . . .

Plate Prices, Page 163

Plate consumers are waiting momentarily for fourth quarter books to open. Mills struck this summer will have no more than a month's tonnage for new orders, and many buyers fear it will be less. Even the few mills which were not struck are not in good shape. In the case of one, high premiums will be asked where tonnage for fairly early delivery is available.

Chicago Bridge & Iron Co., Chicago, has been awarded the contract for the construction of a huge steel sphere to house General Electric Co.'s atomic reactor being built

for Commonwealth Edison Co. at Dresden, Ill. The sphere will require 3000 tons of plates. The contract was awarded by Bechtel Corp., San Francisco, engineer-constructor. The plant is the largest atomic power station to be scheduled.

Structural Shapes . . .

Structural Shape Prices, Page 163

Fabricators will be haunted by the shortage of shapes for some months. There's still some question as to exactly what the leading shape mills will have to offer during the remainder of the year. In any event, there will be far less tonnage than demanded. Some fabricating shops are curtailing their operations further, pending more normal shipments from the mills.

Construction continues at a high level in Portland, Ore.: American Bridge Co. will fabricate over 5000 tons for the Morrison street bridge in Portland and a Washington state bridge in Seattle; Judson-Pacific - Murphy Co., Oakland, Calif., is furnishing 5500 tons of shapes for the interstate bridge at Vancouver, Wash.; Gunderson Bros. Engineering Co., Portland, is fabricating 4400 tons of heavy plate girders for local bridge projects; Independent Iron Works, Oakland, has 1200 tons of shapes for another bridge.

Other fabricators report numerous contracts involving small tonnages and making up heavy backlogs. Portland fabricators expect to feel the full weight of the strike in another 15 days.

Wire . . .

Wire Prices, Pages 165 & 166

A Pittsburgh wire producer fears further increases in the price of merchant wire may result in increased foreign competition. The firm reports European wire is being sold in this country for as much as $1.20 a ton below American prices.

Most wire producers are accepting tonnage for shipment over the remainder of the year. Demand for manufacturers wire appears to be stepping up, because excess stocks have been worked off to some extent. Consumption is at the best level since May.

Tin Plate . . .

Tin Plate Prices, Page 165

Shipments of metal cans in June totaled 402,030 tons and brought the total for the first six months up to 2,143,419 tons, compared with 1,954,563 tons in the first half of 1955, reports the Bureau of Census. The June figure compared with a revised total of 335,538 tons in May.

Movement of fruit and vegetable cans during the first half amounted to 562,844 tons, against 482,988 tons in the same period last year. The June total was 110,177 tons, compared with the revised figure for May of 74,838 tons and 113,044 tons in June, 1955.

Beer cans, the second largest category, totaled 379,550 tons in the first six months, against 349,651 tons in the same period last year. June shipments totaled 92,035 tons, against 70,864 tons in May and 78,536 in June, 1955.

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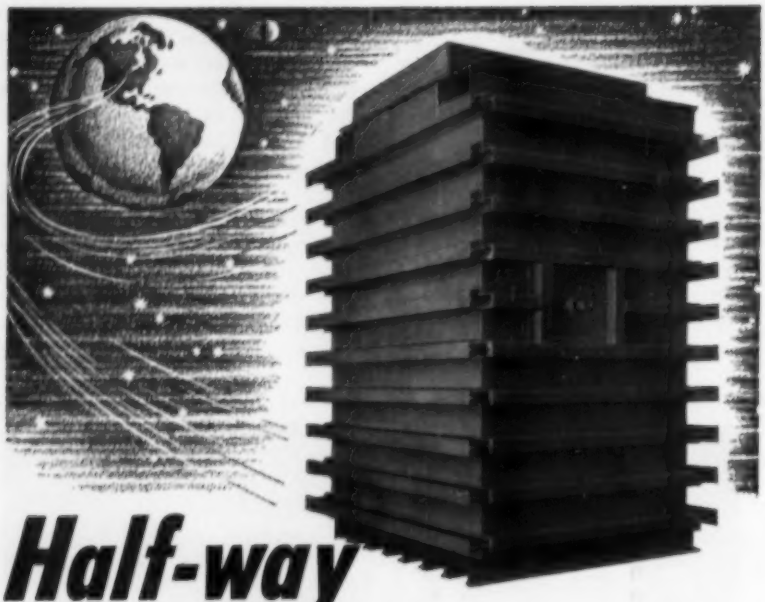

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U.S. Steel Corp. increased prices on steel drums and pails at certain of its producing plants 10 per cent, effective Aug. 13. The hikes apply to unshipped business on the division's books as well as on new orders.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Producers of small buttweld tube are optimistic about sales for the rest of the year, but they admit the steel strike decreased replacement demand. Many suppliers of equipment to the steel mills have experienced postponed orders.

Boiler tube is in demand by domestic heater makers who are anticipating heavy fall sales. Boiler tubemakers are already working at capacity to fill a heavy demand from the utilities.

Warehouse . . .

Warehouse Prices, Page 168

Warehousemen are adjusting their prices to conform with mill increases. The revisions are moderate.

Chicago distributors are continuing to turn away plate and shape business, and are having increasing difficulty meeting the demand for hot and cold sheets.

Steel Bars . . .

Bar Prices, Page 163

A fourth quarter pickup in appliance sales should help barmakers operate at capacity for the rest of the year.

Cold-finished bar production in Pittsburgh will be slow to return to prestrike volume. Columbia Steel & Shafting Co., Carnegie, Pa., is still suffering from the effects of a flood in early August. Production by the nonintegrated producer will begin on a limited scale about Aug. 21.

Orders for hot carbon bars are being accepted for fall delivery. There will be little to offer for October because of carry-overs. Tightest in supply will be the large rounds and flats, say some producers who were behind on committments before the strike began.

Most consumers are obtaining alloy bars and cold-finished carbon bars within a reasonable time and with some shopping around.

Some of the poststrike pressure

for bars has been softened by reduced manufacturing schedules of farm equipment manufacturers.

Worcester Pressed Steel Co., Worcester, Mass., is closing on current committments of cold-finish carbon bars. Its cold-rolling mill will be dismantled Nov. 1.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 169

Pittsburgh — The Pittsburgh Coke & Chemical Co., Neville Island, Pa., raised its oven foundry coke price $2 per ton, effective Aug. 10. The price on beehive oven coke is firming at Connellsville, Pa., as steel production grows toward capacity again. A good grade of furnace coke costs as much as $14.75 a net ton. Foundry coke ranges between $17 and $18 a ton.

Pig Iron . . . .

Pig Iron Prices, Page 168

Demand for merchant pig iron is light this month, reflecting reduced foundry melting rates and good inventories held over from June, but foundries are beginning to come into the market again.

Pig is moving well at the advances of $2.50 a ton which are generally in effect among northern furnaces.

Armco Steel Corp.'s Bellefonte blast furnace at Ashland, Ky., is being relined at a cost of $1 million. The job will be completed in 60 days. The Sixth street furnace is also down for a complete rebuilding and relining job.

Wisconsin Steel Works, International Harvester Corp., relighted its South Chicago, Ind., No. 3 furnace. Inland Steel Co. relighted its Indiana Harbor No. 6 furnace.

Iron Ore . . .

Iron Ore Prices, Page 169

Youngstown district steel firms are arranging for all-rail shipments of iron ore next winter to beat the threat of an acute shortage of ore.

Problems in all-rail shipments during the winter: The hopper car shortage; high rail freight cost; cost of unloading frozen ore; and blending the ore, which is usually done when transferring ore between ships and rail cars.

Shipments of Lake Superior ore to date this year are 10,696,451

How Norgren AUTOMATIC-DRAIN Air Line Filters REDUCE WEAR On Air-Equipment

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1 Abrasive Materials Filtered
Abrasive materials such as grit, pipe scale and rust are automatically filtered from compressed air lines.

2 Corrosive Liquids Removed
An efficient baffle creates a strong centrifugal action that "wrings" oil and corrosive moisture from the air.

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Collected liquids are automatically drained through a float-controlled, pilot-operated mechanism that discharges only when the liquid reaches a designated level, reducing air requirements, and eliminating unnecessary draining action.

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As long as there is pressure on the system the drain operates around the clock, with or without air flow.

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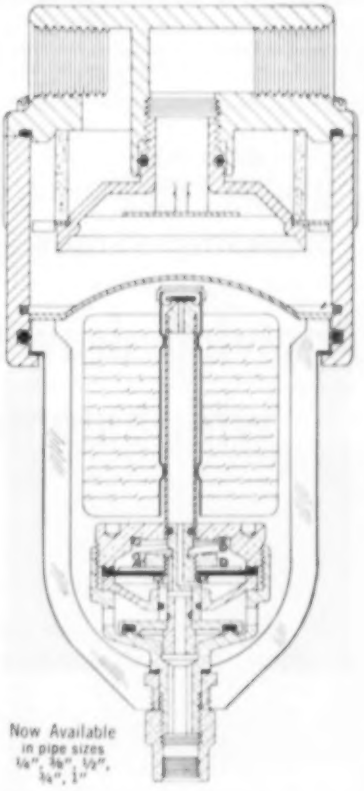
Solids are prevented from entering the drain mechanism to prevent clogging and assure trouble-free operation. A transparent bowl provides a clear view of liquid accumulation and the drain action.



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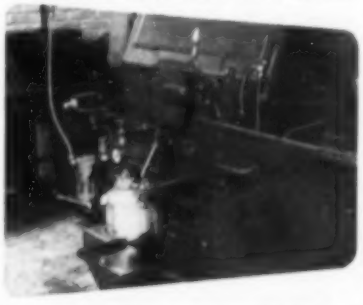

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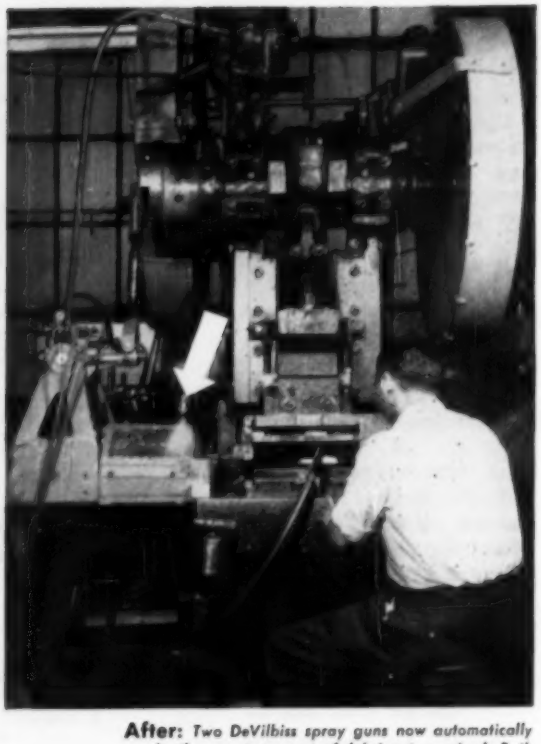
Before: *This operation typifies how the Toledo Pressed Steel Company formerly hand-lubricated and -fed aluminum flat stock to a punch press. Job was messy, slow, left stamping excessively greasy.*



After: *Two DeVilbiss spray guns now automatically apply the exact amount of lubricant required. Both sides of stock get uniform coating in specific areas.*

Use of compound cut 59%!

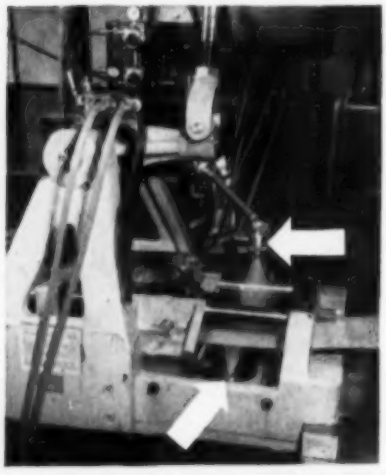
Stamping output upped 100%!

Applying drawing compound with automatic spray

By using two DeVilbiss guns to automatically apply drawing compound – the Toledo Pressed Steel Company, Toledo, Ohio, is able to reap all the benefits of automatic stock-feeding.

Now, as the aluminum coil stock feeds to a 50-ton punch press, the DeVilbiss guns automatically spray both sides – and only on those areas requiring lubrication. This accurate, uniform coating has reduced compound use 59% over former roller-application method; made the entire operation cleaner; and greatly reduced tears and breaks in the stampings. Thanks to DeVilbiss spray, output is doubled!

Why don't you investigate today. In addition to speeding production, saving drawing compound, reducing scrap and press cleanup time – the DeVilbiss spray method eliminates "hit or miss" lubrication and cuts operator fatigue. Contact your DeVilbiss representative.



The spray action of the guns is automatically synchronized with the mechanical slide feed.

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gross tons under 1955's shipments for the same period, reports the Lake Superior Iron Ore Association. Only 260,655 gross tons came down in the week ended Aug. 13, compared with 411,105 gross tons in the same week last year. Cumulative shipments this year total 35,842,152 gross tons.

Container Shipments Up

First half movement of steel shipping barrels was 20,015,250 units, compared with 18,110,132 units in last year's first half, reports the Bureau of Census. June shipments totaled 3,807,310 units, compared with 3,639,589 units the previous month.

Semifinished Steel . . .

Semifinished Prices, Page 163

Bethlehem Pacific Coast Steel Corp.'s Vernon, Calif., plant lost about 41,000 tons of steel ingots during the strike. Columbia-Geneva Steel Division, U. S. Steel Corp., lost 38,000 tons.

Northwest Steel Rolling Mills Inc., Seattle, which closed July 31, is negotiating a new contract with the union.

Strike's Cost Is Added Up

The strike cut the production of steel to 1,610,000 net tons in July, reports the American Iron & Steel Institute. The operating rate fell to 14.8 per cent of capacity. During the same month last year, the industry operated at 85.3 per cent of capacity, turned out 9,100,946 tons of steel.

In the first seven months of this year, steel production totaled 64,254,175 tons, the third highest mark for any similar period in history. Production in the first seven months of 1955 was 66,307,248 tons; a record 67,221,609 tons were produced in the 1953 period.

During July, open-hearth furnaces operated at 13.9 per cent of capacity, while electric furnaces ran at 29.9 per cent. The strike cost a loss of almost 10 million tons of steel, figuring lower production in June and July. Additional losses will be recorded for August and September as the industry attempts to get back to capacity operations.

	—OPEN HEARTH—		—BESSEMER—		—ELECTRIC—		—TOTAL—	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.2	819,485	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
†June	8,698,000	94.2	283,000	71.9	777,000	84.0	9,758,000	92.5
†2nd. Qtr..	27,506,112	98.2	887,378	74.4	2,378,671	84.7	30,772,161	96.2
†1st 6 Mo.	56,020,590	100.0	1,817,216	76.1	4,806,369	85.6	62,644,175	97.9
†July	1,324,000	13.9	.....	....	286,000	29.9	1,610,000	14.8
1955								
January ..	8,854,345	86.0	199,229	49.0	584,162	63.6	8,837,736	82.7
February .	7,734,884	91.5	197,091	53.7	564,959	66.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.8	666,235	72.6	9,981,754	93.4
1st Qtr. ..	24,849,255	91.4	651,813	55.2	1,815,356	66.1	27,316,424	88.0
April	8,858,549	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	305,347	75.1	715,679	77.9	10,328,318	96.6
June	8,784,439	96.6	283,544	72.0	698,493	78.6	9,746,487	94.1
2nd Qtr. ..	26,950,279	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mos.	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,234,535	88.1	268,348	66.1	660,063	65.5	9,100,946	85.3
August ...	8,609,612	91.8	288,972	73.5	694,961	75.7	9,594,545	89.7
September .	8,829,266	97.6	307,171	78.2	745,888	84.1	9,882,325	95.7
3rd Qtr. ..	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mos. ...	77,441,938	93.9	2,390,264	66.6	5,951,916	73.6	85,784,118	91.1
October ...	9,369,704	100.0	330,156	81.2	861,196	87.3	10,561,060	98.2
November .	9,141,244	100.8	306,674	77.9	799,488	89.9	10,247,396	99.0
December .	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	96.5
4th Qtr. ..	27,917,479	100.5	929,259	77.0	2,465,235	88.3	31,251,967	98.6
Last Half .	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	95.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

*Revised. †Preliminary figures subject to revision

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STREET _____

CITY _____ ZONE _____ STATE _____

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5950 tons, superstructure, elevated highway, New Orleans approach, Mississippi river bridge, Pontchartrain expressway (two contracts) to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1395 tons, bridge, relocation U. S. route 23, Flint river, near Flint, Mich., to R. C. Mahon Co., Detroit.

820 tons, bridge on route M-46, relocation over Saginaw river, Saginaw county, Michigan, to R. C. Mahon Co., Detroit.

640 tons, plant, Hussman Refrigerator Co., Delaware township, Camden county, New Jersey, to Anthracite Bridge Co., Scranton, Pa.

370 tons, bridge, Beecher road over relocation of U. S. route 23, near Flint, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

315 tons, five state bridges and approaches, Winchester, Conn., to McDermott Steel Specialties Co., New Haven, Conn., through E. T. O'Neil & Son Construction Co., Holyoke, Mass., general contractor.

STRUCTURAL STEEL PENDING

1110 tons, sheet piling, including 126 tons fabricated Y-piles, Corps of Engineers, Buffalo; bids Aug. 30.

1000 tons, Einstein Medical Hospital, Philadelphia; bids Aug. 21.

400 tons, substation steel for Bonneville Power Administration, Portland, Oreg.; Bethlehem Pacific Coast Steel Corp., Seattle, low $117,741.

300 tons, public school, Radnor, Pa.; bids asked.

250 tons, addition, junior high school No. 178, Bronx, New York; bids Aug. 22.

200 tons, new public school No. 117, Manhattan, New York; bids Aug. 22.

REINFORCING BARS . . .

REINFORCING BARS PLACED

135 tons, five state bridges and approaches, Winchester, Conn., to Bethlehem Steel Co., Bethlehem, Pa., through E. T. O'Neil & Son Construction Co., Holyoke, Mass., general contractor.

REINFORCING BARS PENDING

1325 tons, Kneeland-Dover street spur, Central Artery, Boston; 33,900 linear ft, steel piles, also will be required.

770 tons, Southwest School, Seattle; general contract to Howard S. Wright Co., Seattle.

340 tons, state bridge work, Washington county, Pennsylvania; bids Aug. 31.

190 tons, three T-beam Washington state bridges, King county; bids to Olympia, Aug. 28.

175 tons, multiple span stringer bridge, Jonesport and Beals Island, Me.; bids Aug. 22, Augusta.

PLATES . . .

PLATES PLACED

3080 tons, sphere to house atomic reactor of nuclear power plant for Commonwealth Edison Co., Joliet, Ill., to Chicago Bridge & Iron Co., Chicago; Bechtel Corp., contractor.

250 tons, 72,500-bbl fuel tank, Rayonier plant, Hoquiam, Wash., to Chicago Bridge & Iron Co., Seattle.

200 tons (including shapes), eight 60 and 54-ft tugs for Morrison-Knudsen Co., to Gunderson Bros. Engineering Corp., Portland, Oreg.

RAILS, CARS . . .

RAILROAD CARS PLACED

Central of Vermont, rebuilding of 100 box-cars, to its St. Albans, Vt., shops.

Nickel Plate, 100 seventy-ton covered hoppers, to Greenville Steel Car Co., Greenville, Pa.

North American Car Corp., 125 covered hoppers with 75 going to Greenville Steel Car Co., Greenville, Pa., and 50 to Pullman-Standard Car Mfg. Co., Chicago. North American also placed 100 tank cars with ACF Industries, New York.

Reading, 100 seventy-ton covered hoppers, to ACF Industries, New York.

Southern Pacific, 150 piggyback flatcars, to own shops under license from Piggyback Inc.

Price Indexes and Composites

Aug. 14, 1956	Week Ago	Month Ago	July Avg.	Year Ago
168.4	166.2	158.6	158.6	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 14

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	*Bars, Reinforcing*	5.738
Rails, Light, 40 lb	6.567	*Bars, C.F., Carbon*	9.610
Tie Plates	6.025	*Bars, C.F., Alloy*	13.275
Axles, Railway	8.950	*Bars, C.F., Stainless, 302 (lb)*	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	*Sheets, H.R., Carbon*	5.695
Plates, Carbon	5.550	*Sheets, C.R., Carbon*	6.639
Structural Shapes	5.267	*Sheets, Galvanized*	8.220
Bars, Tool Steel, Carbon (lb)	0.480	*Sheets, C.R., Stainless, 302 (lb)*	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	*Sheets, Electrical*	11.225
Bars, Tool Steel, H.R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.275	*Strip, C.R., Carbon*	8.841
Bars, Tool Steel, H.R. Alloy, High Speed W18 Cr 4, V 1 (lb)	1.770	*Strip, C.R., Stainless, 403 (lb)*	0.475
Bars, H.R., Alloy	10.025	*Strip, H.R., Carbon*	5.900
Bars, H.R., Stainless, 302 (lb)	0.483	*Pipe, Black, Buttweld (100 ft)*	18.376
Bars, H.R., Carbon	5.925	*Pipe, Galv., Buttweld (100 ft)*	22.516
		Pipe, Line (100 ft)	182.360
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	42.357	Black Plate, Canmaking Quality	7.133
Tubing, Mechanical, Carbon (100 ft)	22.633	*Wire, Drawn, Carbon*	9.175
Tubing, Mechanical Stainless, 304 (100 ft)	181.793	*Wire, Drawn, Stainless, 430 (lb)*	0.630
Tin Plate, Hot-dipped, 1.25 lb	9.333	*Bale ties (bundle)*	7.211
Tin Plate, Electrolytic, 0.25 lb	8.033	*Nails, Wire, 8d Common*	9.268
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 15 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.71	225.71	210.45	207.63	171.92
Index in cents per lb	6.114	6.114	5.701	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.59	$138.50	$131.28	$127.41	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	60.84	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	59.96	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	61.45	59.77	53.27
Steelmaking Scrap, GT	56.67	54.83	45.50	44.17	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

†Preliminary

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 15 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	4.65	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	4.65	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.85*	6.85*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	4.60	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	4.60	4.60	3.65
Shapes, deld. Philadelphia	5.00	5.00	5.00	4.88	3.91
Plates, Pittsburgh	4.85	4.85	4.50	4.50	3.70
Plates, Chicago	4.85	4.85	4.50	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	4.80	4.50	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.25	6.317	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.25-6.35	6.35-6.45	4.90
Strip, C.R., Detroit	6.35-6.95	6.35-6.95	6.35-6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.35	8.35	7.60	7.60	5.90-6.20
Tin plate (1.50 lb.),box, Pitts.	$9.85	$9.85	$9.85	$9.65	$8.70

*Including 0.35c for special quality

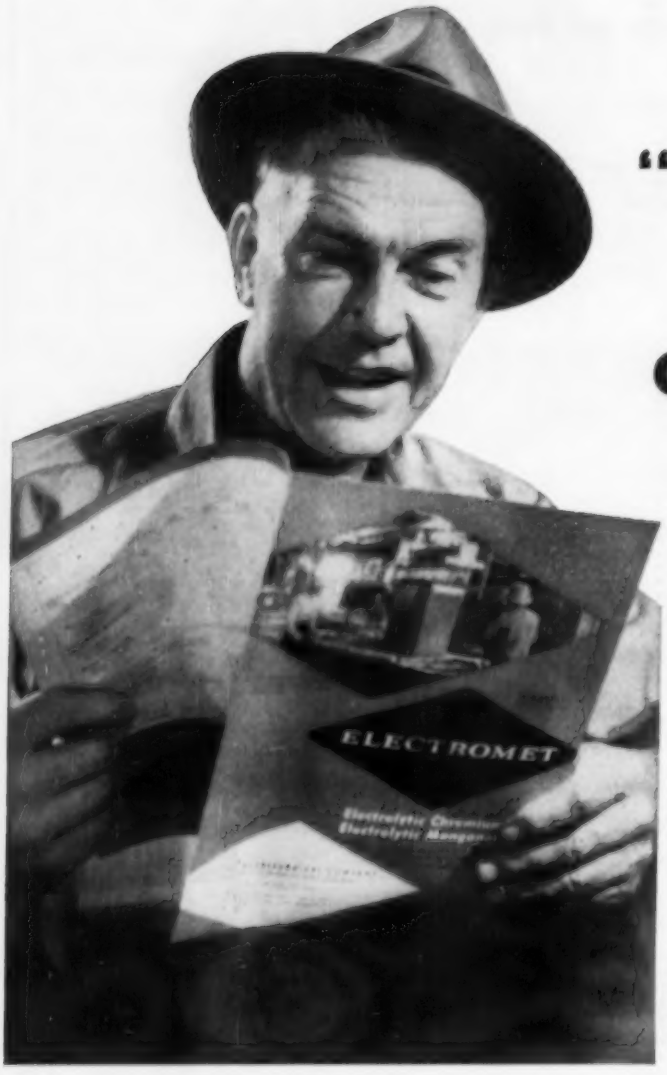
SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$84.50	$84.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-⅜" Pitts.	5.80	5.375	5.375	5.025	4.10-4.30

PIG IRON, Gross Ton	Aug. 15 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$62.25	$59.50	$53.00
Basic, Valley	62.50	62.50	60.00	58.50	52.00
Basic, deld. Phila.	66.26	66.26	63.75	59.16	56.49
No. 2 Fdry,Neville Island,Pa.	63.00	63.00	63.00	59.00	52.20
No. 2 Fdry, Chicago	63.00	63.00	60.50	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	64.26	59.66	56.99
No. 2 Fdry, Birm.	59.00	59.00	57.00	55.00	48.88
No. 2 Fdry(Birm.)deld. Cin.	66.70	66.70	62.70	62.70	55.33
Malleable, Valley	63.00	63.00	60.50	59.00	52.50
Malleable, Chicago	63.00	63.00	60.50	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$54.00	$55.50	$43.50	$44.50	$45.00
No. 1 Heavy Melt, E. Pa.	57.00	55.00	47.00	46.00	43.50
No. 1 Heavy Melt, Chicago	59.00	54.00	46.00	42.00	43.50
No. 1 Heavy Melt, Valley	64.50	60.50	44.50	46.50	45.00
No. 1 Heavy Melt, Cleve.	62.00	57.50	42.50	44.00	44.00
No. 1 Heavy Melt, Buffalo	54.50	49.50	42.50	39.50	44.00
Rails, Rerolling, Chicago	80.50	75.50	67.50	64.50	52.50
No. 1 Cast Chicago	53.50	50.50	45.50	45.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.125	$14.125	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	16.50	16.50	16.50	17.50



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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 164; to footnotes, page 166.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $74.00
Bessemer,Pa. U5 ..... 74.00
Bridgeport,Conn. N19 ..... 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ..... 81.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 ..... 74.00
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 74.00
Pittsburgh J5 ..... 74.00
S.Chicago,Ill. R2, U5 ..... 74.00
S.Duquesne,Pa. U5 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $91.50
Bessemer,Pa. U5 ..... 91.50
Bridgeport,Conn. N19 ..... 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 ..... 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ..... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 ..... 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 91.50
Pittsburgh J5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ..... 91.50
S.SanFrancisco B3 ..... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $107.00
Bridgeport,Conn. N19 ..... 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 ..... 114.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 ..... 107.00
Johnstown,Pa. B2 ..... 107.00
Lackawanna,N.Y. B2 ..... 107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 107.00
S.Duquesne,Pa. U5 ..... 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 111.50
S. Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.625
SparrowsPoint,Md. B2 ..4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.375
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1 ..... 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 ..... 6.05
Kokomo,Ind. C16 ..... 5.475
LosAngeles B3 ..... 6.16
Minnequa,Colo. C10 ..... 6.05
Monessen,Pa. P7 ..... 5.80
N.Tonawanda,N.Y. B11 ..... 5.80
Pittsburg,Calif. C11 ..... 6.45
Portsmouth,O. P12 ..... 5.725
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ..... 6.25
Sterling,Ill. N15 ..... 6.35
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 ..... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.30
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.70
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor,Ind. I-2 ..... 5.00
Johnstown,Pa. B2 ..... 5.05
KansasCity,Mo. S5 ..... 5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 ..... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 ..... 5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14 ..5.00
S.SanFrancisco B3 ..... 5.65
Torrance,Calif. C11 ..... 5.70
Weirton,W.Va. W6 ..... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.85
IndianaHarbor,Ind. I-2..5.00
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 ..... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Clairton,Pa. U5 ..... 6.20
Fontana,Calif. K1 ..... 7.85
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clariton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.05
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 ..... 7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14 ..7.35
S.SanFrancisco B3 ..... 8.00
Struthers,O. Y1 ..... 7.350

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Ind.Harbor,Ind. I-2 ..... 7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 ..... 4.65
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.90
Lackawanna,N.Y. B2 ..... 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. B2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky. (15) A10 ..... 4.85
Bessemer,Ala. T2 ..... 4.85
Bridgeport,Conn. N19 ..... 4.75
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 ..... 5.35
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 ..... 4.90
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 ..... 5.55
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 ..... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 ..... 4.85
LoneStar,Tex. L6 ..... 4.85
Minnequa,Colo. C10 ..... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. N9 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.90
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ..... 4.85
Warren,O. R2 ..... 4.85
Weirton,W.Va. W6 ..... 4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.70
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 ..... 7.45
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 ..... 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 ..... 7.95
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 ..... 7.25

PLATES, Alloy

Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 ..... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 ..... 7.55
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 ..... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. N9 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14 ..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ..... 6.275
Ind.Harbor,Ind. I-2..... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 5.10
Ashland l.c.l. (15) A10 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..... 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ..... 5.375
Bridgeport,Conn. N19 ..... 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 ..... 5.175
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ..... 5.225
Fontana,Calif.(9) K1 ..... 5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva(9) C11 ..... 5.175
Houston(9) S5 ..... 5.125
Ind.Harbor,Ind.(9) I-2 5.075
Ind.Harbor,Ind.(9) Y1 ..... 5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo.(9) S5 ..... 5.225
Lackawanna(9) B2 ..... 5.075
Midland,Pa.(9) C18 ..... 4.65
Milton,Pa. M18 ..... 5.225
Minnequa,Colo. C10 ..... 5.525
Niles,Calif. P1 ..... 5.85
N.Tonawanda,N.Y.(9) B11 5.075
Pittsburg,Calif.(9) C11 5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'c'go(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 ..... 5.825
Sterling,Ill.(1) N15 ..... 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11 ..5.775
Weirton,W.Va.(9) W6 ..... 5.075
Youngstown(9) R2, U5 ..5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 6.125
Bridgeport,Conn. N19 ..... 6.30
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 ..... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.175
Ind.Harbor,Ind. I-2, Y1 6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. S5 ..... 6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ..... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.40
Bridgeport,Conn. N19 ..... 7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 ..... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind.Harb.,Ind. Y1 ..... 7.425
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 ..... 7.675
Lackawanna,N.Y. B2 ..... 7.40
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 7.55
S.Chicago U5, W14 ..... 7.425
S.Duquesne,Pa. U5 ..... 7.425
S.SanFrancisco B3 ..... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Lackawanna(9) B2 ..... 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 ..... 6.45
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 9.225
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 6.85
BeaverFalls,Pa. M12 ... 6.25
BeaverFalls,Pa. R2 ..... 6.85
Bridgeport,Conn. N19 ..... 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.25
Chicago W18 ..... 6.85
Cleveland A7 ..... 6.85
Cleveland C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.25
FranklinPrk,Ill. N5 .... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 ..... 6.85
Hammond,Ind. L2, M13 6.85
Hartford,Conn. R2 ..... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) 830 .... 7.70
LosAngeles R2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 ... 6.85
Midland,Pa. C18 ..... 6.25
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.25
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 ..... 7.10
Putnam,Conn. W18 ..... 7.40
Readville,Mass. C14 ..... 7.40
S.Chicago,Ill. W14 ..... 6.85
SpringCity,Pa. K3 ..... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F1, Y1 ..... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 .5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 8.325
BeaverFalls,Pa. M12 ... 7.425
BeaverFalls,Pa. R2 ..... 8.325
Bethlehem,Pa. B2 ..... 8.1325
Bridgeport,Conn. N19 ..... 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 8.325
Cleveland A7, C20 ..... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 7.425
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 7.425
FranklinPark,Ill. N5 .... 8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 ..... 8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ..... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 ..7.425
LosAngeles 830 ..... 9.10
Mansfield,Mass. B5 .... 8.625
Massillon,O. R2 R8 ..... 8.325
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 ..... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 ..... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 ..... 8.625
Youngstown F1, Y1 ..... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.375
Bridgeport,Conn. N19 ..... 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala. T2 ..... 5.075
Fairless,Pa. U5 ..... 5.225
Fontana,Calif. K1 ..... 5.80

Ft.Worth,Tex.(42) T4 5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 .....5.075
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 .....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 .....5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. 04 .....5.85
Sand Springs,Okla. S5 .5.575
Seattle B3 N14 .....5.825
S.Chicago R2 .....5.075
S.Duquesne,Pa. U5 ...5.075
S.SanFrancisco B3 .....5.825
SparrowsPoint,Md. B3 5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-3" B2 .6.71
KansasCity,Kans. S5 ..6.825
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U5 .....6.17
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 .6.71
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

Chicagolito.(3) C2, I-2 5.075
Chicagolito.(4) C2, I-2 5.075
Ft.Worth,Tex.(26) T4 5.525
Franklin,Pa. (3) (4) F5 4.65
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) (4) B12 5.15
Williamsport,Pa.(3) S19 5.65

BARS, Wrought Iron

Economy,Pa. (S.R.) B14 12.305
Economy,Pa.(D.R.) B14 15.301
Economy(Staybolt) B14 15.676
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5 .17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 .....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 .4.875
IndHarbor, Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ...4.675
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.725
Riverdale,Ill. A1 .....4.725
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 .....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 .....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 ga. & Lighter)

Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 .....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 .....6.90
Youngstown U5, Y1 ..6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A-10 ..4.925
Ind.Harbor,Ind. I-2 ....4.925

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Dravosburg,Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 .....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..5.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.925
SparrowsPoint,Md. B2 5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....5.525
Dravosburg,Pa. U5 ....5.525
Ecorse,Mich. G5 .....5.625
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....9.725
Gary,Ind. U5 .....5.525
IndianaHarbor,Ind. Y1 5.525
Lackawanna(37) B2 ....5.525
Pittsburgh J5 .....5.525
SparrowsPoint(38) B2 5.525
Warren,O. R3 .....5.525
Weirton,W.Va. W6 ....5.525
Youngstown Y1 .....5.525

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	*6.65*	*6.90*
Canton,O. R2	*6.15*	*7.15*
Dravosburg U5	*6.65*	*6.90*
Fairfield T2	*6.65*	*6.90*
Gary,Ind. U5	6.65	6.90
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.60	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	*7.40*	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ...6.90
MartinsFry.O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 .....6.50‡
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 .....6.35†
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 .....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 .....6.30

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ...9.275
SparrowsPoint(39) B2 9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 .....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 .....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 .....6.325
Niles,O. M21 .....5.90
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 .....6.70
Niles,O. M21 .....6.25
Weirton,W.Va. W6 .....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Irvine, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div. Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division. Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 NationalTube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	*4.675*
Alton,Ill. LI	*4.875*
Ashland,Ky.(8) A10	*4.675*
Atlanta A11	*4.875*
Bessemer,Ala. T2	4.675
Birmingham C15	*4.975*
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	*4.775*
Ecorse,Mich. G5	*4.775*
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	*5.475*
Gary,Ind. U5	4.675
Houston S5	*4.925*
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity S5	*4.925*
Lackaw'na,N.Y.(28) B2	4.675
LosAngeles(25) B3	*5.425*
Minnequa,Colo. C10	*5.775*
Pittsburg,Calif. C11	8.425
Riverdale,Ill. A1	4.725
SanFrancisco S7	5.05
Seattle(25) B3	*5.675*
Seattle N14	5.40
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	*5.425*
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	*4.675*
Sterling,Ill. N15	*4.775*
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	*4.675*
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Dravosburg U5	*7.75*
Fontana,Calif. K1	9.05
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	*7.75*
LosAngeles B3	*8.95*
Newport,Ky. N9	*7.75*
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	*7.05*
Fairfield,Ala. T2	6.95
Fontana,Calif. K1	8.025
Gary,Ind. U5	6.95
Houston S5	*7.20*
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	*7.20*
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	*7.70*
Seattle(25) B3	*7.95*
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	*7.70*
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	*6.95*
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	*6.925*

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	*6.95*
Detroit P20	6.35
Detroit D2 M1	*6.95*
Dover,O. G6	6.85
Ecorse,Mich. G5	*6.95*
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	*8.60*
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. Y1	*6.85*
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.90
NewBedford,Mass. R10	*7.30*
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7, D2	7.30
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	*7.50*
Pawtucket,R.I. N8	6.80
Pittsburgh J5	*6.85*
Riverdale,Ill. A1	6.95
Rome,N.Y. (32) R6	*6.85*
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(11) R5	*8.40*
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	*6.85*
Worcester,Mass. A7	7.40
Youngstown C8, Y1	*6.85*

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	14.55
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	*10.00*
Dearborn,Mich. D3	*10.20*
Dover,O. G6	9.30
Ecorse,Mich. G5	*10.20*

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1			*12.90*	*15.30*	*18.25*
Carnegie,Pa. S18		9.05	10.60	12.75	
Cleveland A7	*7.70*	*9.80*	*12.60*	*15.00*	*17.95*
Cleveland C7		9.05	10.60	12.75	15.45
Dearborn,Mich. D3	*8.05*	*9.90*	*12.70*		
Detroit D2	7.20	9.15	10.70	12.85	
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18			10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	
NewKensington,Pa. A6	7.10	9.05	10.60		
NewYork W3		*10.10*	*12.90*	*15.30*	*18.25*
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y. (32) R6	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
Trenton,N.J. R5		9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	*8.25*	*10.10*	*12.90*	*15.30*	*18.25*
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)	Up to 0.80c	0.81-1.05c	1.06-1.35c
Bristol,Conn. W1	*16.80*	*20.65*	
Buffalo W12	14.80		
FranklinPark,Ill. T6	15.15	18.50	22.35
Harrison,N.J. C18	14.80	18.15	22.00
NewYork W3	*16.80*	*20.65*	*25.00*
Trenton,N.J. R5	14.80	18.15	22.00
Worcester,Mass. W12	14.80		
Worcester,Mass. A7, T6	*16.80*	*20.65*	*25.00*
Youngstown C8	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10			11.00	12.05	13.05
Brackenridge,Pa. A4			*11.00*	*12.05*	*13.05*
Mansfield,O. E6	*9.20*	*10.35*	*11.00*	*12.05*	*13.05*
Newport,Ky. N9	*9.20*	*10.35*	*11.00*	*12.05*	*13.05*
Niles,O. M21	8.40	9.35	9.95	10.95	
Vandergrift,Pa. U5		10.35	11.00	12.05	13.05
Warren,O. R2	*9.40*	*10.35*	*11.00*	*12.05*	
Zanesville,O. A10		*10.35*	*11.00*	*12.05*	*13.05*

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4			*11.525*	*12.575*	*13.55*
GraniteCity,Ill. G6	*9.40**	*10.55**	*11.225**	*12.275**	
IndianaHarbor,Ind. I-2, Y1	9.20†	10.35*	11.025*	12.075*	
Mansfield,O. E6	*9.70*	*10.85*	*11.525*	*12.575*	*13.55*
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5		10.85†	11.525†	12.575†	13.55†
Warren,O. R2	*9.20**	*10.85*	*11.525*	*12.575*	*13.55*

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.95	14.60	15.10	16.15
Brackenridge,Pa. A4	*14.05*			
Vandergrift,Pa. U5	14.95	14.60	15.10	16.15
Zanesville,O. A10	*14.05*	*14.60*	*15.10*	*16.15*

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4		*16.90*	*18.50*	*19.00*	*19.50*	*14.05***
Butler,Pa. A10			*18.30*	*19.00*	*19.50*	
Vandergrift,Pa. U5	*15.90*	*16.90*	*18.50*	*19.00*	*19.50*	*14.55***
Warren,O. R2						*14.55†*

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ¼c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975		
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15

SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	*7.15*
Gary,Ind. U5	*7.15*
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	*7.15*
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 8 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	*7.20*
Alton,Ill. LI	*7.40*
Atlanta A11	*7.40*
Bartonville,Ill. K4	*7.30*
Buffalo W12	6.60
Chicago W11	*7.20*
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	6.70
Donora, Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	*7.30*
Houston S5	*7.45*
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	*7.45*
Kokomo,Ind. C16	7.20
LosAngeles B3	*8.15*
Minnequa,Colo. C10	*7.45*
Monessen,Pa. P7	*7.20*
N.Tonawanda B11	*7.20*
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.10
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	*8.15*
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	*7.20*
Sterling,Ill. N15	*7.30*
Struthers,O. Y1	*7.20*
Waukegan,Ill. A7	7.20
Worcester, Mass. A7	7.50

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	*8.725*
Alton,Ill. LI	*8.925*
Bartonville,Ill. K4	*8.825*
Buffalo W12	7.90
Cleveland A7	8.725
Donora, Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O. S1	*8.775*
Johnstown,Pa. B2	8.725
LosAngeles B3	*9.675*
Millbury,Mass.(12) N6	8.50
Minnequa,Colo. C10	*8.975*
Monessen,Pa. P7, P16	*8.725*
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.60
Roebling,N.J. R5	*9.025*
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	*9.675*
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	*8.725*
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester,Mass. A7	9.025
Worcester 34, T6, W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	*8.40*
Alton,Ill. LI	*8.60*
Buffalo W12	7.60
Cleveland A7	8.40
Donora, Pa. A7	8.40
Duluth,Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	*8.65*
LosAngeles B3	*9.35*
Minnequa,Colo. C10	*8.60*
Monessen,Pa. P7, P16	*8.40*
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.30
Roebling,N.J. R5	*8.70*
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	*9.35*
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	*8.40*
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. LI	*14.35*
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W11	*11.55*
Cleveland A7	*14.15*
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	*11.55*
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	*14.15*
Kokomo,Ind. C16	13.05
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	*14.15*
Worcester,Mass. A7,T6	*14.45*

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	*11.75*
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	*12.55*
Portsmouth,O. P12	11.50
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	*11.85*
Struthers,O. Y1	*11.625*

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	*11.35*
Johnstown,Pa. B2	10.55
Monessen,Pa. P7, P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P16	11.35
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	*11.35*
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.25
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.50
Cleveland A7	*10.75*
Crawfordsville,Ind. M8	9.50
Dover,O. G6	10.25
Fostoria,O. S1	*10.50*
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	9.50
Massillon,O. R8	9.50
Milwaukee C23	*10.95*
Monessen,Pa. P7, P16	9.50
Pawtucket,R.I. M8	9.80
Riverdale,Ill. A1	9.60
Rome,N.Y. R6	*10.75*
Trenton,N.J. R5	9.80
Worcester, A7,T6,W12	*11.05*

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	167
Aliquippa,Pa. J5	*167*
Atlanta A11	*169*
Bartonville,Ill. K4	*169*
Chicago,Ill. W13	*167*
Cleveland A9	173
Crawfordsville,Ind. M8	154
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Houston,Tex. S5	*172*
Jack'ville,Fla.(20) M8	163
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
KansasCity,Mo. S5	*172*
Kokomo,Ind. C16	169
Minnequa,Colo. C10	*172*
Monessen,Pa. P7	*167*
Pittsburg,Calif. C11	186
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	*167*
Worcester,Mass. A7	173

(To Wholesalers; per cwt)

Galveston,Tex. D7	*8.75*

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.85
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	167
Aliquippa,Pa. J5	*167*
Atlanta A11	*169*
Bartonville,Ill. K4	*169*
Crawfordsville,Ind. M8	154
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Jack'ville,Fla.(20) M8	163
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
Kokomo,Ind. C16	169
Minnequa,Colo. C10	*172*
Monessen,Pa. P7	*167*
Pittsburg,Calif. C11	186
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	*167*
Worcester,Mass. A7	173

TIE WIRE, Automatic Soler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$9.45
Bartonville,Ill. K4	*10.11*
Buffalo W12	9.45
Crawfordsville,Ind. M8	9.55
Donora,Pa. A7	*10.01*
Duluth,Minn. A7	*10.01*
Jacksonville,Fla. M8	10.01
Johnstown,Pa. B2	*10.01*
Joliet,Ill. A7	*10.01*
Kokomo,Ind. C16	9.55
LosAngeles B3	10.24
Minnequa,Colo. C10	*10.28*
Pittsburg,Calif. C11	*10.81*
S.Chicago,Ill. R2	9.45
SparrowsPt.,Md. B2	*10.11*
Sterling,Ill. N15	*10.01*

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.75
Bartonville,Ill. K4	*10.45*
Buffalo W12	9.75
Crawfordsville,Ind. M8	9.85
Donora,Pa. A7	*10.35*
Duluth,Minn. A7	*10.35*
Jacksonville,Fla. M8	10.31
Johnstown,Pa. B2	*10.35*
Joliet,Ill. A7	*10.35*
Kokomo,Ind. C16	9.85
LosAngeles B3	10.55
Minnequa,Colo. C10	*10.60*
Pittsburg,Calif. C11	*11.15*
S.Chicago,Ill. R2	9.75
SparrowsPt.,Md. B2	*10.45*
Sterling,Ill. N15	*10.35*

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.80
Bartonville,Ill. K4	*10.50*
Buffalo W12	9.80
Crawfordsville,Ind. M8	9.90
Donora,Pa. A7	*10.40*
Duluth,Minn. A7	*10.40*
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	*10.40*
Joliet,Ill. A7	*10.40*
Kokomo,Ind. C16	9.90
LosAngeles B3	10.60
Minnequa,Colo. C10	*10.65*
Pittsburg,Calif. C11	*11.20*
S.Chicago,Ill. R2	9.80
SparrowsPt.,Md. B2	*10.50*
Sterling,Ill. N15	*10.40*

WIRE, Barbed Col.

AlabamaCity,Ala. R2	187**
Aliquippa,Pa. J5	*186§*
Atlanta A11	*193*
Bartonville,Ill. K4	*193*
Crawfordsville,Ind. M8	181
Donora,Pa. A7	187†
Duluth,Minn. A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	*192°°*
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	191*
Joliet,Ill. A7	187†
KansasCity,Mo. S5	*192°°*
Kokomo,Ind. C16	193†
Minnequa,Colo. C10	*192°°*
Monessen,Pa. P7	*191*
Pittsburg,Calif. C11	207†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187°°
S.SanFrancisco C10	195°°
SparrowsPoint,Md. B2	193*
Sterling,Ill.(1) N15	*191°*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	181°°
Aliq'ppa,Pa. 9-14½ga.J5	*184§*
Atlanta A11	*187*
Bartonville,Ill. K4	*187*
Crawfordsville,Ind. M8	168
Donora,Pa. A7	181†
Duluth,Minn. A7	181†
Fairfield,Ala. T2	181†
Houston,Tex. S5	*186°°*
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	185
Joliet,Ill. A7	181†
KansasCity,Mo. S5	*186°°*
Kokomo,Ind. C16	180†
Minnequa,Colo. C10	*180°°*
Monessen,Pa. 9 ga. P7	*185°*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	181†
S.Chicago,Ill. R2	181°°
Sterling,Ill.(1) N15	*185°*

	An'ld Galv.	Stone
WIRE (16 Gage)	**Stone**	
Ala.City R2	14.50	16.05°°
Bartonville K4	*16.10*	*18.05*
Buffalo W12	14.50	
Cleveland A7	*16.10*	
Crawf'dsville M8	16.50	16.55
Fostoria,O. S1	*15.60*	*17.15†*
Jacksonville M8	14.85	16.80
Johnstown B2	*16.10*	*18.05°*
Kokomo C16	15.10	16.65†
Minnequa C10	*16.45*	*18.15°°*
Palmer,MassW12	14.50	16.05°
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R3	14.50	16.05°°
SparrowsPt. B2	*16.20*	*18.15°*
Sterling(1) N15	*16.10*	*18.05°*
Waukegan A7	*16.10*	*17.65*
Worcester A7	*16.40*	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.10 8.50°°
Aliquippa J5	*8.10 8.625§*
Atlanta A11	*8.20 8.80*
Bartonville(48) K4	*8.20 8.80*
Buffalo W12	7.50 7.90†
Cleveland A7	8.10
Crawfordsville M8	7.60 8.20
Donora,Pa. A7	8.10 8.50†
Duluth,Minn. A7	8.10 8.50†
Fairfield T2	8.10 8.50†
Houston(48) S5	*8.35 8.75°°*
Jacks'ville,Fla. M8	7.85 8.45
Johnstown B2(48)	8.10 8.70°
Joliet,Ill. A7	8.10 8.50†
Kans.City(48) S5	*8.35 8.75°°*
Kokomo C16	8.10 8.50
Los Angeles B3	*9.05 9.65°*
Minnequa C10	*8.35 8.75°°*
Monessen P7 (48)	*8.10 8.70°*
Palmer,Mass. W12	7.80 8.20†
Pitts.,Calif. C11	9.05 9.45†
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.10 8.50††
S.Chicago R2	8.10 8.50°°
S.SanFran. C10	*9.05 9.65°°*
SparwsPt. B2(48)	8.20 8.80°
Str'ling(1)(48) N15	*8.10 8.70°*
Struth'rs,O.(48) Y1	*8.10 8.60†*
Worcester,Mass. A7	8.40 8.80†

Based on zinc price of: *15.50c. †5c. ‡10c. §Less than 10c. ††13c. °°Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	195
Atlanta A11	*197*
Bartonville,Ill. K4	*197*
Crawfordsville,Ind. M8	177
Donora,Pa. A7	195
Duluth,Minn. A7	195
Fairfield,Ala. T2	195
Jacksonville,Fla. M8	182
Joliet,Ill. A7	195
Houston S5	*200*
KansasCity,Mo. S5	*200*
Kokomo,Ind. C16	179
Minnequa,Colo. C10	*200*
Pitts.,Calif. C11	199
S.Chicago R2	195
S.SanFran.,Calif. C10	*219*
SparrowsPoint,Md. B2	197
Sterling,Ill.(1) N15	*195*

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	*167*
Franklin,Pa. F5	157
Huntington,W.Va. W7	169
Johnstown,Pa. B2	*167*
Marion,O. P11	157
Minnequa,Colo. C10	*172*
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread) †½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted): ½" x 6" and smaller	61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized: ½" and smaler	42
Larger than ½" diam. and all diams. longer than 6"	32
Lag Bolts All diams. & 6" and shorter	61
All diams. longer than 6"	55
Plow, Tap & Blank Bolts ½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55
Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts: All sizes	61

STOVE BOLTS, SLOTTED

(Nuts not attached; bulk)	
½" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅜" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces.	61
100,000 or more pieces	64

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
⅜" to ½" diam. incl.:	
15,000 to 99,999 pieces	20
100,000 or more	27

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:	
6" and shorter:	
¼" through ½" diam.	34
⅝" & ¾" diam.	31
⅞", 1"	8
Longer than 6":	
¼" through ⅝" diam.	3
¾" through 1" diam.	+13
High Carbon, Heat-treated:	
6" and shorter:	
¼" through ¼" diam.	20
⅜" & ⅝" diam.	16
⅞", 1"	+11
Longer than 6":	
¼" through ⅝" diam.	+23
¾" through 1" diam.	+41

(New Std. Hexagon head, upset, bulk)

Bright:	
½" x 6" & smaller & shorter	49
⅝", ¾", ⅞" diam. x 6" & shorter	48
⅝", ⅞", 1" x 6" & shorter	31
High Carbon, Heat-treated:	
½" x 6" & smaller & shorter	41
⅝" x ⅞" diam. & 6" & shorter	39
⅝", ⅞", 1" x 6" & shorter	20

NUTS

Reg. & Heavy Square Nuts: All sizes	61
H.P. Reg. & Heavy Hex Nuts:	
⅝" & smaller	64
¾" to 1⅛" incl.	63
1¼" to 1½" incl.	65
1⅝" & larger	61
C.P. Reg. & Heavy Hex Nuts	
⅝" & smaller	64
¾" & larger	61
Semifinished & Finished Nuts	
¾" & smaller	66
⅞" & larger	63

Semifinished Slotted Reg. & Heavy Hex Nuts	
¾" & smaller	66
⅞" & larger	63
Hot Galvanized Nuts, all types	
1½" & smaller	44

(On above items, add 25% for less than case quantities)

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅝" incl., Square:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
No. 2 to ⅝" incl., Hex.:	
25,000 to 199,999 pieces	18
200,000 or more pieces	25

RIVETS

F.o.b. Cleveland and/or Pittsburgh, f.o.b. Chicago, and/or freight equalized with Pittsburgh except where equalization is too great.

Structural ½-in., larger 10.85
⅞-in. under List less 26.5%

BOILER TUBES

Net base c.i. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1⅝	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2⅛	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2⅝	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	4.975	5.075	...(16)	6.00
Minnequa,Colo. C10	*5.075*	*4.975*	....	*6.50*
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	*6.025*
Seattle B3	*6.175*
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

TRACK BOLTS, Untreated

Cleveland R2	*13.10*
Lebanon,Pa. B2	*13.10*
Minnequa,Colo. C10	*13.10*
Pittsburgh P14	*13.10*
Seattle B3	*13.60*

*Treated

AXLES

Ind.Harbor,Ind. S13	*8.10*
Johnstown,Pa. B2	8.10

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	*6.35*
Steelton,Pa. B2	6.35

SCREW SPIKES

Cleveland R2	*12.85*
Pittsburgh P14	*12.85*

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	*8.775*
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	*8.775*
Pittsburgh J5	*8.775*
Seattle B3	*9.275*
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	*8.775*
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) R-inforcing.
(5) 1½-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.25c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.50c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.055"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	5.5	+10.25	8.25	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2		4.5		7		5.5		8.25		8.25		10.75	
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.25	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	6.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	6.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5							12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1							10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36								
Etna, Pa. N2							12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3							10.5	+8.75	13.5	+6.75	16	+1.25	18.5	0.5
Fontana, Calif. K1							6	+13.25	9	+9.25	11.5	+5.75	14	+4
Indiana Harbor, Ind. Y1							11.5	+7.75	14.5	+4.75	17	+0.25	19.5	1.5
Lorain, O. N3							12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	10	+20.5	0.5	+27	+8.5	+36								
Sharon, Pa. M6							12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1							12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	21	4.75	23	4.75				
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75				
Benwood, W. Va. W10	21	3.5	21.5	4	21	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	21	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75				
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75				
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	....	39.25	41.25	45.25	45.25
301	20.50	25.25	....	....	34.00	38.50	40.50	....	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.75	43.75	....	....	....
304	23.25	29.25	36.00	....	39.75	41.00	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.50	50.50	53.25	57.75	57.75
305	24.75	32.50	....	....	43.00	41.00	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.75	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.75	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.75	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.75	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.25	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.75	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-SCbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	....	....
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	....	....	....
420	....	32.25	33.00	....	40.25	38.00	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	....	....	....
431	....	27.25	35.50	....	....	39.75	41.75	43.50	....	....
446	....	....	37.75	....	56.75	42.75	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co., Washington Steel Corp.

Clad Steel

	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	30.50
304	34.60	41.50	32.50
304-L	37.20	44.65	....
316	38.70	46.65	....
316-L	45.70	54.35	....
316-CB	45.90	54.75	....
321	36.35	43.40	37.25
347	39.50	48.45	48.25
405	29.20	37.95	....
410	28.70	36.55	....
430	28.70	36.55	....
Inconel	52.50	68.45	....
Nickel	44.10	58.65	....
Nickel, Low Carbon	46.30	63.15	....
Monel	47.00	62.55	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled: 10%	Strip, Carbon Base—Cold Rolled: Both Sides
Copper*	33.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	*5% Cr Hot Work*	0.450
Extra Carbon	0.345	*W-Cr Hot Work*	0.430
Special Carbon	0.410	*V-Cr Hot Work*	0.460
Oil Hardening	0.450	*Hi-Carbon-Cr*	0.810

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.185
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
13.5	4	3	....	....	1.945
6	4	2	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. *Minimum delivered prices are approximate and do not include 3% federal tax.*

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R3	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	*73.79*	*74.29*	*74.79*	....
Rochester,N.Y., deld.	*65.52*	*66.02*	*66.52*	....
Syracuse,N.Y., deld.	*66.62*	*67.12*	*67.62*	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R3	62.50	....	63.00	....
S.Chicago,Ill. Y1	*62.50*	*63.00*	*63.00*	....
S.Chicago U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee deld.	64.80	65.30	65.30	65.80
Muskegon,Mich. deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	*64.50*	*65.00*	*65.50*	*66.00*
Pittsburgh District				
Neville Island,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.76	64.76	65.29
Verona,Trafford, deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U8	62.50	....	....	....
Midland,Pa. C18	*62.50*	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	*63.00*	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	*63.00*	*63.50*
Mansfield,O., deld.	*67.40*	....	*67.90*	*68.40*
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Texas *LS*	....	55.00*	....	....
Minnequa,Colo. C10	*64.50*	*65.00*	*65.50*	....
Rockwood,Tenn. T3	....	*59.00‡*	*63.00*	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.50%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	*72.75*

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	*$76.00*
Rockwood,Tenn. T3 (Phos. 0.035% max)	*76.00*
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Neville Island,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled[9]	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††[11]		Carbon	Floor
Atlanta	7.97	8.76	10.29	....	8.05	8.11	. .	10.07	....	8.28	8.45	10.25
Baltimore	7.79	8.90	9.12	....	8.27	8.34	8.47	9.09[3]	15.69	8.57	8.12	9.56
Birmingham	7.63‡	8.50‡	8.85‡	....	7.71	7.77	8.95	...	....	7.93	7.95	10.00
Boston	8.62	9.37	10.82	57.24	8.71	8.71	9.26	10.36	14.16	8.77	8.91	10.34
Buffalo	7.70	8.50	10.51	....	7.85	7.85	8.55	8.40	14.00	8.10	8.30	9.50
Chattanooga	7.78‡	8.60‡	8.60‡	....	7.86	7.92	8.45	...	....	8.13	8.19	9.82
Chicago	7.63	8.49	9.60	....	7.71	7.77	8.30	8.25	13.65	7.93	7.95	9.22
Cincinnati	7.75	8.48	9.60	....	7.95	8.01	8.54	8.65	13.90	8.40	8.24	9.47
Cleveland	7.63	8.49	9.45	....	7.81	7.83	8.36	8.50	13.71	8.26	8.12	9.39
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.82	8.68	9.88	....	7.99	8.05	8.58	8.54	13.89	8.40	8.23	9.41
Erie, Pa.	7.58	8.74	9.45[10]	....	7.81	7.85	...	8.60[10]	....	8.15	7.80	9.29
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	7.96‡	8.77‡	9.22‡	....	7.94	8.09	8.62	...	....	8.25	8.27	9.94
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.40	8.30	8.75	10.85
Milwaukee	7.72	8.58	9.60	....	7.80	7.86	8.39	8.44	13.74	8.10	8.04	9.31
Moline, Ill.	7.48	8.30	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.28	9.13	10.13	56.13	8.73	8.66	9.21	10.27	14.07	8.61	8.71	10.90
Norfolk, Va.	7.85	...	...	....	8.30	8.35	....	10.80	....	8.60	8.10	9.80
Philadelphia	7.80	9.06	9.91	....	8.38	8.37	8.76	9.12	13.85	8.38	8.28	9.37
Pittsburgh	7.68	8.55	10.05	50.00	7.88	7.91	8.44	8.60	13.65	8.05	8.01	9.26
Portland, Oreg.	8.95	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	7.85	...	9.99	....	8.45	8.45	8.80	10.00	....	8.70	8.15	9.85
St. Louis	7.92	8.78	9.89	....	8.00	8.06	8.59	8.79	13.94	8.33	8.24	9.51
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.85	10.40	10.65	51.65	9.05	8.90	9.65	12.55	13.35[3]	8.95	8.85	11.25
Seattle	9.35	11.20	11.55	52.60	9.50	9.30	9.85	13.15	15.60	9.15	9.05	11.25
Spokane, Wash.	9.25	11.40	11.40	....	9.40	9.10	9.65	12.75	15.90	9.00	9.00	11.70
Washington	8.31	10.43	...	....	8.99	8.74	...	9.90	....	9.02	8.64	11.10

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [9]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmuth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stephens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $124.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzels (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ¼-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43. ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot), nom.	24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1 0.	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, iregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20

Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-51.00†
Bronze, 5000-lb lots	61.25-65.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	$4.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	59.25-62.25†
Phosphor-Copper, 5000-lb lots	67.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (in.)	Length (in.)	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	*$14.25-14.75*
Connellsville, foundry	*17.00-18.00*

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	27.50
Camden, N. J., ovens	*28.50*
Detroit, ovens	27.50
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*30.55**
Indianapolis, ovens	28.75
Ironton, O., ovens	*28.00*
Cincinnati, deld.	*28.25*
Kearny, N. J. ovens	*28.75*
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	29.50
Neville Island (Pittsburgh), Pa., ovens	*28.25*
Painesville, O., ovens	*29.50*
Cleveland, deld.	*31.55*
Philadelphia, ovens	*28.50*
St. Louis, ovens	28.50
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.05	$7.05	$7.05	$7.45
Bar Size Angles	6.90	6.90	6.90	7.30
Structural Angles	7.45	7.45	7.45	7.85
I-Beams	7.65	7.65	7.65	8.05
Plates	8.90	8.90	8.90	9.30
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.50	26.50	26.50	26.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	7.00	7.00	7.00	7.40
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5.	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.80	7.80	7.80	8.10
Oil Country Pipe: Mills withdrawn for remainder of the year.				

†Per 82-lb. net, reel. §Per 100-lb kegs, 20d nails and heavier

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton. Palmerton, Pa. 21-23% Mn, $98.50; 19-21% Mn, 1-3% Si, $96; 16-19% Mn, $94.00.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C, 31.00c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P. 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 3c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contact $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 30.25c, 0.03% max 28.75c, 0.06% max 27.25c, 0.1% max 26.75c, 0.15% max 26.50c, 0.2% max 26.25c, 0.5% max 26.00c, 1.0% max 25.25c, 1.5% max 25.10c, 2.0% max 25.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 25-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.9c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.8c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10 14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 45-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 39-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

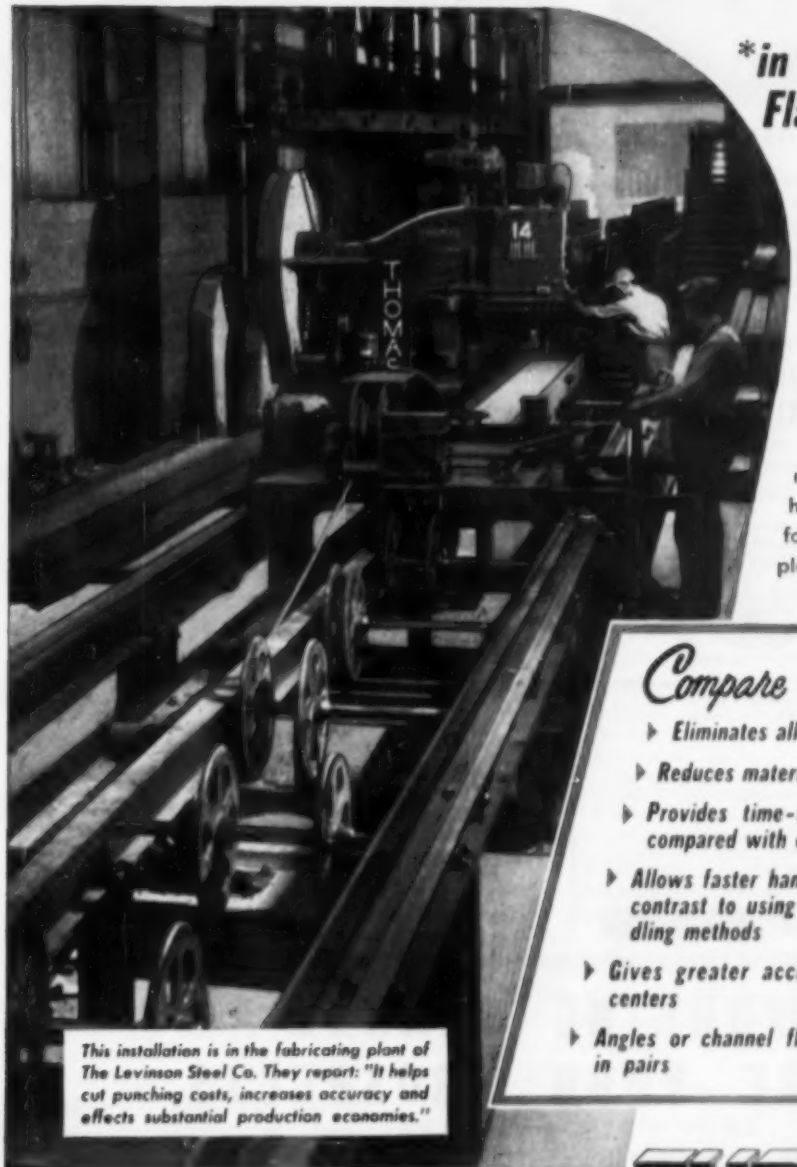
Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Sigle, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth and Washington, Pa.

576 holes punched*

in 25 minutes – without layout!



This installation is in the fabricating plant of The Levinson Steel Co. They report: "It helps cut punching costs, increases accuracy and effects substantial production economies."

*in the web of a 24" Wide Flange Beam 40 ft. long

An Eastern Fabricator used this 225-ton Beam Punch with Motorized Indicator Spacing Table to meet a very special punching problem. His requirements were for the maximum number of punchings in minimum time on a 24-inch wide flange beam forty feet long.

This Thomas combination, requiring no layout, solved his problem. It can help you, too, as proved by the performance records of machines in the plants of other important fabricators.

Compare these Advantages...

- *Eliminates all layout and marking*
- *Reduces material handling*
- *Provides time-saving multiple punching as compared with ordinary single hole punching*
- *Allows faster handling through the punch, in contrast to using jib cranes and other handling methods*
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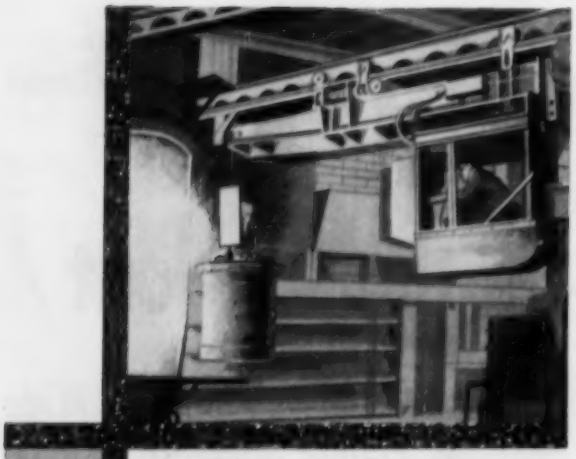

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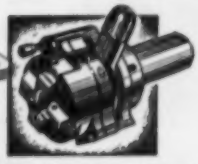

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Steelmaking Scrap Prices Soar

Advance to all-time high is supported by heavy domestic demand and active buying for foreign account. Uptrend is expected to continue until heavy mill buying stabilizes market

Scrap Prices, Page 174

Philadelphia—Open-hearth scrap prices advanced further here and still higher levels are probable before the market begins to level off. Advances have been on small sales with demand accumulating and with dealers holding back in anticipation of higher levels.

Chicago—Rise in scrap prices continues here despite the absence of large volume buying by mills. The best gage of the market is the price level of brokers' offerings to dealers, with price variations amounting to $2 or $3. Industrial and railroad grades are particularly strong. Return of heavy buying by mills which is imminent should stabilize the market.

New York — Brokers increased their buying prices last week. Strength reflects scarcity of material in meeting domestic and export requirements. Foreign shipments have held up well, mainly to European destinations. Larger buying than anticipated from Canada and Japan is expected to bring exports from this country to a higher level than last year's.

Buffalo — Steelmaking scrap prices jumped another $5 a ton here when a leading consumer placed new business for the first time since before the strike. Supplies remain tight. Blast furnace scrap failed to follow open-hearth grades higher in the absence of mill buying. Cast grades are firmer, while railroad specialties and low phos scrap were quoted at higher levels.

Boston—No. 2 heavy melting and lighter grades of steel scrap are stronger pricewise, although advances are not as sensational as the recent ones for No. 1 heavy melting. Differential between heavy melting grades still averages slightly better than $10 a ton.

Birmingham—Open-hearth scrap was purchased by the two major consumers (Tennessee Coal & Iron Division, U. S. Steel Corp. and Republic Steel Corp.) last week and brokers apparently had little difficulty in filling orders. Lack of intrastate rail shipments of scrap (due to dealer resistance to increased rates) was noted. Most scrap moving to local mills is being trucked. Cast grades are still in demand at steady prices.

Pittsburgh—In the absence of mill buying, No. 1 heavy melting scrap lost some of its strength last week. Bidding to fill previous orders had hit a peak of $57 a ton in early August, but this extremely heavy demand declined as mills built up their inventories. Leading buyers of scrap on the open market say they can buy all they need for $55 a ton. Mills have adequate inventories, and are resisting the higher price trends.

Railroad scrap and cut structurals continue to grow stronger. Latest prices paid for No. 1 railroad heavy melting averaged $67 a ton.

San Francisco—Scrap prices advanced $2 to $7 a ton here last week. Buying spurted as mills resumed production, with one mill operating at 134 per cent of rated capacity. A leveling off in scrap demand is looked for later. Cast grades also were strong, with No. 1 cupola rising $4 a ton.

Seattle—With the resumption of operations by the principal buyer, scrap prices advanced $2 a ton last week. The market is strong due to heavy domestic consumption and an active export demand. While receipts are sufficient to cover requirements, there is no sizable surplus.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 15	$56.67
Aug. 8	54.83
July Avg.	47.70
Aug. 1955	43.97
Aug. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*53.00-55.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*53.00-55.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*53.00-55.00*
Machine shop turnings	36.00-37.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	40.00-41.00
Cast iron borings	40.00-41.00
Cut structurals, 3 ft lengths	*67.00-68.00*
Heavy turnings	*49.00-50.00*
Punchings & plate scrap	*67.00-68.00*
Electric furnace bundles	*67.00-68.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	44.00-45.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	*66.00-67.00*
Rails, 2 ft and under	*75.00-76.00*
Rails, 18 in. and under	*76.00-77.00*
Rails, random lengths	*69.00-70.00*
Railroad specialties	*72.00-73.00*

Stainless Steel Scrap

18-8 bundles & solids	375.00-385.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	*61.50-62.50*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*61.50-62.50*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*61.50-62.50*
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	*62.50-63.50*
Cut structural plates 2 ft and under	*67.00-68.00*
Alloy free, short shovel turnings	*43.00-44.00*
Electric furnace bundles	*62.50-63.50*

Cast Iron Grades

No. 1 cupola	56.00-57.00
Charging box cast	*50.00-51.00*
Heavy breakable cast	*48.00-49.00*
Stove plate	*54.00-55.00*
Unstripped motor blocks	*36.00-37.00*
Brake shoes	*44.00-45.00*
Clean auto cast	56.00-57.00
Burnt cast	*43.00-44.00*
Drop broken machinery	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*65.00-66.00*
R.R. malleable	*70.00-71.00*
Rails, 2 ft and under	*80.00-81.00*
Rails, 18 in. and under	*82.00-83.00*
Rails, random lengths	*75.00-76.00*
Cast steel	*69.00-70.00*
Railroad specialties	*74.00-75.00*
Uncut tires	*73.00-74.00*
Angles, splice bars	*74.00-75.00*
Rails, rerolling	*75.00-76.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	80.00-89.00

YOUNGSTOWN

No. 1 heavy melting	*64.00-65.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*64.00-65.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*64.00-65.00*
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	*65.00-66.00*
Electric furnace bundles	*65.00-66.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*66.00-67.00*

CHICAGO

No. 1 heavy melting	*58.00-60.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 factory bundles	*62.00-63.00*
No. 1 dealer bundles	*56.00-57.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*58.00-60.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*35.00-36.00*
Cut structurals, 3 ft	*65.00-66.00*
Punchings & plate scrap	*66.00-67.00*

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Stove plate	*47.00-48.00*
Unstripped motor blocks	*41.00-42.00*
Clean auto cast	*57.00-58.00*
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*61.00-62.00*
R.R. malleable	*70.00-71.00*
Rails, 2 ft and under	*80.00-81.00*
Rails, 18 in. and under	*81.00-82.00*
Angles, splice bars	*73.00-74.00*
Rails, rerolling	*80.00-81.00*

Stainless Steel Scrap

18-8 bundles & solids	405.00-425.00
18-8 turnings	310.00-325.00
430 bundles & solids	105.00-110.00
430 turnings	52.50-57.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*53.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*54.00*
No. 2 bundles	39.00
No. 1 busheling	*52.00*
Machine shop turnings	29.00
Mixed borings, turnings	*31.00*
Short shovel turnings	*33.00*
Punchings & plate scrap	*57.00*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	*41.00*
Stove plate	*42.00*
Heavy breakable	*41.00*
Unstripped motor blocks	*32.00*
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	*24.00-25.00*
Short shovel turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Bar Crops and plate	55.00-56.00
Structural & plate, 2 ft	54.00-55.00
Unstripped motor blocks	41.00-42.00
Charging box cast	*35.00-36.00*
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 18-in. and under	*62.00-63.00*
Rails, rerolling	*66.00-67.00*
Rails, random lengths	*59.00-60.00*
Angles, splice bars	*58.00-59.00*

PHILADELPHIA

No. 1 heavy melting	*57.00*
No. 2 heavy melting	*47.00*
No. 1 bundles	*57.00*
No. 2 bundles	*45.00*
No. 1 busheling	*57.00*
Electric furnace bundles	*59.00*
Mixed borings, turnings	38.00
Machine shop turnings	37.00-38.00
Short shovel turnings	*43.00*
Heavy turnings	*53.00*
Structurals & plates	*60.00-61.00*
Couplers, springs, wheels	*67.00*
Rail crops, 2 ft & under	69.00-70.00

Cast Iron Grades

No. 1 cupola	52.00-53.00
Malleable	*68.00*
Heavy breakable cast	*55.00*
Drop broken machinery	*58.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*51.00*
No. 2 heavy melting	*41.00*
No. 1 bundles	*51.00*
No. 2 bundles	*39.00*
Machine shop turnings	28.00-29.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	33.00-34.00
Low phos. (structural & plate	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Unstripped motor blocks	*36.00-37.00*
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-51.50
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	51.00-51.50
No. 2 bundles	*34.00-35.00*
No. 1 busheling	51.00-51.50
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*30.00-31.00*
No. 1 cast	43.00-43.50
Mixed cupola cast	38.50-39.00
No. 1 machinery cast	44.50-45.00

BUFFALO

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*54.00-55.00*
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	*58.00-59.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*45.00-46.00*
No. 1 machinery	*51.00-52.00*

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	*57.00-58.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*54.50-55.50*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*54.50-55.50*
No. 2 bundles	40.50-41.50
No. 1 busheling	*54.50-55.50*
Machine shop turnings	33.50-33.50
Mixed borings, turnings	34.50-35.50
Short shovel turnings	36.50-37.50
Cast iron borings	34.50-35.50
Low phos., 18 in.	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	46.00-47.00
Charging box cast	46.00-47.00
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*59.00-60.00*
Rails 18 in. and under	*74.00-75.00*
Rails random lengths	*65.00-66.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	46.00
No. 2 bundles	36.00
No. 1 busheling	46.00
Machine shop turnings	26.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	42.00
Heavy breakable cast	42.00
Unstripped motor blocks	39.00
Brake shoes	49.50
Clean auto cast	50.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	59.00
Rails, 18 in. and under	72.00
Rails, random lengths	70.00
Rails, rerolling	78.00
Angles, splice bars	70.00

SEATTLE

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*42.00*
No. 2 bundles	*31.00*
Machine shop turnings	*25.00-27.00*
Mixed borings, turnings	*25.00-27.00*
Electric furnace No. 1	*54.00-56.00*

Cast Iron Grades

No. 1 cupola	*45.00-47.00*
Heavy breakable cast	*40.00-42.00*
No. 1 wheels	37.00
Unstripped motor blocks	*42.00*
Stove plate (f.o.b. plant)	*33.00-35.00*

LOS ANGELES

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*45.00*
No. 2 bundles	*35.00*
Machine shop turnings	*26.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*50.00*

SAN FRANCISCO

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*41.00*
No. 1 bundles	*44.00*
No. 2 bundles	35.00
Machine shop turnings	*25.00*
Mixed borings, turnings	*25.00*
Cast iron borings	*25.00*
Heavy turnings	*25.00*
Short shovel turnings	*28.00*
Cut structurals	*52.00-54.00*

Cast Iron Grades

No. 1 cupola	*52.00*
Charging box cast	*45.00-47.00*
Stove plate	*48.00*
Heavy breakable cast	*42.00*
Unstripped motor blocks	*41.00*
Clean auto cast	*52.00*
No. 1 wheels	*45.00-47.00*
Drop broken machinery	*52.00*

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	40.00
No. 2 bundles	35.50
Mixed steel scrap	37.00
Busheling, new factory: Prepared	41.00
Unprepared	37.00
Short steel turnings	20.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

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Aluminum, Mag Hike Prices

Producers cite rising production costs as main reason. Another boost of 1 cent a pound may be in the offing for aluminum to cover fringe benefits and expansion

Nonferrous Metal Prices, Pages 178 & 179

MAKE two more entries—aluminum and magnesium—in the "higher cost of living" list. Primary producers of aluminum raised their ingot price to 27.10 cents a pound (formerly 25.90) and pig to 25.00 cents a pound (formerly 24.00). Magnesium followed with a 1.50-cent boost for both pig and ingot, bringing those prices up to 34.25 and 36.00 cents a pound.

Both industries gave increased production costs as the reason for the boosts. Parts of the aluminum industry were still shut down last week as the United Steelworkers struck for a package similar to the one it got from the steel industry. A four-week strike at Dow Chemical's reduction plants at Freeport and Velasco, Tex., was settled Aug. 10.

Closing the Gap—This brings the prices of aluminum and copper closer together than they have been since January, 1955, when copper was at 30 cents a pound and aluminum was at 23.20 cents. The price gap is still wide at 12.90 cents (primary copper now 40 cents a pound).

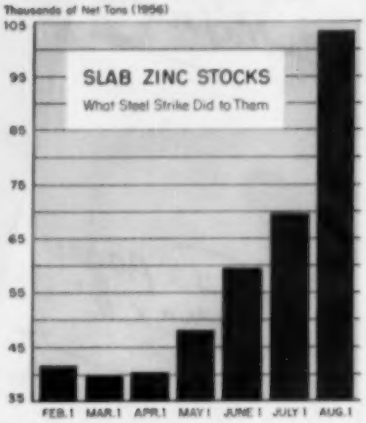
Surprise — In announcing the latest increase, aluminum producers surprised the trade by using the small increment. Conservative price boosts by the steel industry and the government's interest in stopping inflation may have had a lot to do with it. However, the industry still needs additional capital to cover fringe benefits of the labor contract and added costs of expansion. They may go after it within 90 days with another increase of 1 cent a pound. This, and the distinct possibility that the copper price has not settled to its best level, may close the price gap even further.

Lead, Zinc Sales Up

Says one primary producer: "Lead sales are good across the board. Battery makers are entering the market, too." Explains another producer: "Battery shipments have been higher than last year's totals. We simply had to wait for them to run out of excessively high lead inventories."

Zinc sales to the steel industry for galvanizing took a jump last week. Diecasters' orders are trickling in.

Owing to the steel strike and further automotive cutbacks, domestic zinc shipments in July dropped to 34,219 tons. During the first quarter, shipments had been over 80,000 tons per month. Stocks at the end of July (primary and secondary smelters) totaled 103,253 tons (see chart).



Source: American Zinc Institute

Brass Mills on the Verge

Wire and cable sales are keeping copper producers in high gear. Red metal sales to brass mills are still light.

One large brass mill indicates it is about ready to buy, but most mills have had to work off substantial tonnages because of the drop in automotive production and the large inventories.

Heavy European demand and the Suez canal crisis continue to cause daily fluctuations in the London Metal Exchange quotations. Last week the level stayed between 38 and 39 cents a pound.

Titanium Output To Rise

Look for at least a 50 per cent gain in titanium sponge production in 1956. Last year's total: 8000 tons.

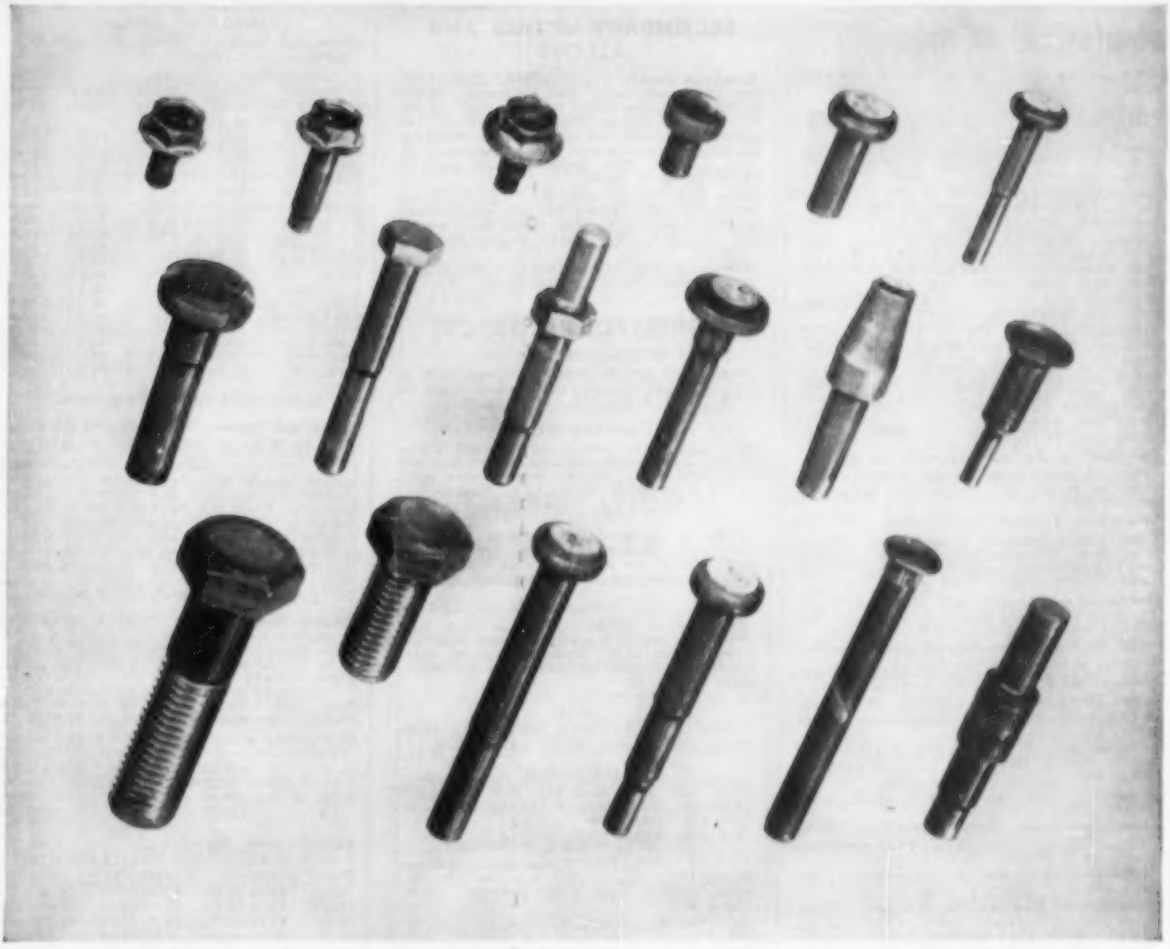
While the total is dependent on how well new facilities are brought to full production levels, sponge output could go to 14,000 tons.

Part of the problem: Trained personnel. A spokesman for Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., reports that its new titanium sponge facilities are currently running at 50 per cent of capacity (annual rate: 7500 tons) due to the lack of trained operators.

NONFERROUS PRICE RECORD

	Aug. 8 Price	Last Change	Previous Price	July Avg.	June Avg.	Aug. 1955 Avg.
Copper	39.75	Aug. 7, 1956	40.00	40.030	43.000	37.759
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.500
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.500	12.500
Tin	98.625	Aug. 13, 1956	98.75	96.435	94.611	96.519
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug. 10, 1956	25.90	25.900	25.900	24.267
Magnesium	35.25	Aug. 13, 1956	33.75	33.750	33.750	30.574

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



Is your part illustrated? These are representative of the shapes that can be cold formed more effectively with Granodraw.

GRANODRAW® PROCESS INCREASES TOOL LIFE 2-5 TIMES IN COLD HEADING STEEL FASTENERS

Thorough research, in cooperation with a leading manufacturer of headed fasteners, has proved the value of Granodraw phosphate coating of stock prior to cold working. Typical of the improvement in tool life and in production are the examples shown in the table.

But the advantages do not stop here in cold heading fasteners or cold working other products. This chemical treatment process permits greater speed of draw; greater reductions within the physical limits of the metal; more passes with the same number of intermediate treatments; and the possibility of fewer process anneals. It also results in less downtime of machines, better surface finish on products, cold forming of more complex shapes, fewer rejects, and a cleaner shop.

Write us for complete information about Granodraw and its application in cold forming operations.

PRODUCTION AND TOOL LIFE

PRODUCT	MATERIAL		AV. PIECES PER DIE DRESSING	
	Tool	Stock	Granodraw-Treated	Other Treatment
⅜ x ⅞ rivet	Hardened Alloy Steel	1010 Steel	647,000	180,500
5/16 x 24 flat head shoulder bolt	Hardened Alloy Steel	1010 Steel	26,000	5000-8000
Hex Head Cap Screws	Hardened Alloy Steel	1038 Steel	53,000	13,000-14,000
¼ x 20 Hex Machine Bolt	Hardened Alloy Steel	1018 Steel	28,000	13,000

Note. Although investigations on the life of carbide tools are not completed, one item deserves mention. A 5/16 x 24 hex head shoulder bolt showed a strikingly low carbide tool life of 67,000 pieces per die. Using Granodraw-treated rod, one die produced 105,000 pieces—another 194,000 pieces. And both dies were in good condition at the end of the run.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICHIGAN ST. JOSEPH, MISSOURI NILES, CALIFORNIA WINDSOR, ONTARIO

CHEMICALS ACP PROCESSES

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.16; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.50; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. Reading, Pa., or Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.40 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.75 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 39.25, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 98.625.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.3% Fe max), $2.70 per pound.

Tungsten: Powder, 98.5%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-30.75; No. 12 foundry alloy (No. 2 grade), 26.50-27.00; 5% silicon alloy, 0.60 Cu max, 28.25-28.50; 13 alloy, 0.60 Cu max, 28.25-28.50; 195 alloy, 28.75-29.00; 108 alloy, 27.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.00, grade 2, 26.25; grade 3, 25.50; grade 4, 25.00.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.80.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.95. Weatherproof, 30,000-lb lots, 43.75; l.c.l., 44.55. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	69.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.8	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.5	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.0

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 30,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
⅜	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.05	6	266.55
1½	44.30	8	401.10

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6061-T6	Alloy 6062-T6
9-11	43.50-45.80	58.80-62.90	58.30-62.40
12-14	43.80-45.20	59.50-63.80	59.00-63.30
15-17	44.00-45.70	60.70-65.40	60.20-64.90
18-20	44.50-46.20	62.60-67.80	62.10-67.30

MAGNESIUM

Sheet and Plate: AZ31A standard grade, 0.32 in., 100.00; 0.81 in., 75.00; .125 in., 68.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .632 in., 163.10; .080 in., 103.50; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.50	99.90-100.80

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 18.00-19.00; old sheets, 15.00-16.00; borings and turnings, 9.50-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube
Copper	61.63b	58.86c	....	61.82
Yellow Brass	52.10	42.65d	52.64	55.01
Low Brass, 80%	55.85	55.79	56.39	58.66
Red Brass, 85%	57.19	57.13	57.73	60.00
Com. Bronze, 90%	59.08	59.02	59.62	61.64
Manganese Bronze	59.46	53.56	63.80	....
Muntz Bronze	53.84	49.65	....	....
Naval Brass	55.72	50.03	62.75	58.88
Silicon Bronze	65.22	64.41	65.26	67.26e
Nickel Silver, 10%	67.76	70.09g	70.09	....
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26

SCRAP ALLOWANCES f

	Clean Heavy	Rod Ends	Clean Turnings
Copper	36.000	36.000	35.250
Yellow Brass	27.250	27.000	25.125
Low Brass, 80%	30.625	30.375	29.875
Red Brass, 85%	31.875	31.625	31.125
Com. Bronze, 90%	33.125	32.875	32.375
Manganese Bronze	25.250	25.000	24.500
Muntz Bronze	25.625	25.375	24.875
Naval Brass	25.250	25.000	24.500
Silicon Bronze	35.000	34.750	34.000
Nickel Silver, 10%	32.750	32.500	16.375
Phos. Bronze, A, 5%	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

10.00; crankcases, 15.00-16.00; industrial castings, 15.00-16.00.

Copper and Brass: No. 1 heavy copper and wire, 31.50-32.00; No. 2 heavy copper and wire, 30.00-30.50; light copper, 27.50-28.00; No. 1 composition red brass, 25.50-26.00; No. 1 composition turnings, 25.00-25.50; yellow brass turnings, 15.00-15.50; new brass clippings, 23.00-23.50; light brass, 14.50-15.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 21.00-21.50; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 19.50-20.00; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 14.50.

Monel: Clippings, 55.00-85.00; old sheets, 55.00-75.00; turnings, 60.00-70.00; rods, 55.00-85.00.

Nickel: Sheets and clips, 120.00-190.00; rolled anodes, 120.00-190.00; turnings, 100.00-150.00; rod ends, 120.00-190.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 20.50-21.00; 3003 clippings, 20.50-20.75; 6151 clippings, 20.50-20.75; 5052 clippings, 20.50-20.75; 2014 clippings, 19.50-20.25; 2017 clippings, 19.50-20.25; 2024 clippings, 19.50-20.25; mixed clippings, 19.25-19.50; old sheets, 17.75-18.00, old cast, 17.75-18.00; clean old cable (free of steel), 19.50-20.50; borings and turnings, 17.25-19.00

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 36.00; No. 2 heavy copper and wire, 32.50; light copper, 30.25; refinery brass (60% copper) per dry copper content, 31.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 36.00; No. 2 heavy copper and wire, 32.50; light copper, 30.00; No. 1 composition borings, 29.50; No. 1 composition solids, 30.000; heavy yellow brass solids, 21.00; yellow brass turnings, 18.00; radiators, 23.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.39.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35; prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 70.90; 100-600 lb, 62.50; 700-1900 lb, 60.00; 2000-9900 lb, 58.30; 10,000 lb or more, 57.10.

Stannous Chloride (anhydrous): Less than 25 lb, 147.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 90.90.

Stannous Sulphate: Less than 50 lb, 120.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

SALES MANAGER

WANTED

The man we're looking for has probably gone as far as he can with his present connection, has a proved record of sales success and is interested in a new position of responsibility that offers greater challenge and possibility of unlimited earnings. We are located in Chicago and manufacture a well known line of industrial marking tools and a new line of protective coatings. We provide plenty of national advertising and direct mail to help you open doors, the rest is entirely up to you. If you can see yourself in this picture, now and for years to come, let's hear from you. Salary commensurate with ability and experience. All correspondence kept confidential. Write Box 453, STEEL, Penton Bldg., Cleveland 13, Ohio.

LUBRICATION ENGINEER

Southern California concern operating a large variety of heavy machinery and mobile equipment has technical staff position open for qualified man with mechanical or chemical engineering degree, or equivalent. Must be able to prescribe correct lubricants and lubricating methods, write specifications and schedules, oversee lubricating costs and standards in wide range of usage. State experience, age, training, etc.

WRITE BOX 442, STEEL

Penton Bldg. Cleveland 13, Ohio

ENGINEER WANTED

ENGINEERS, DESIGNERS AND CHECKERS WHO ARE QUALIFIED PERSONNEL WITH EXPERIENCE IN DESIGNING AND BUILDING HEAVY MACHINERY. OFFICES LOCATED IN MID-WEST. EXCELLENT OPPORTUNITIES DUE TO BACKLOG OF ORDERS.

REPLY BOX 447, STEEL
PENTON BLDG., CLEVELAND 13, OHIO

LAYOUT MAN

WANTED BY WELL ESTABLISHED STEEL FABRICATORS IN CONNECTICUT. EXCELLENT OPPORTUNITY.

Write Box No. 452, STEEL
Penton Bldg. Cleveland 13, Ohio

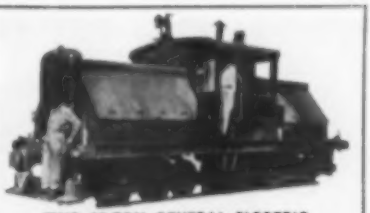
STEEL PRODUCTS—Warehouse specializing in Cold Finished Steel Bars desires mill representation of other products. Would consider putting in an inventory of product for warehouse sales. Write Stanley Steel Service Corporation, 1612 William Street, Buffalo 6, New York.

CLASSIFIED

Positions Wanted

POSITION WANTED

Forge shop Superintendent, 19 years experience, 11 years actual forging, 8 years Management. Experienced on Steam Hammers from 2000 to 35,000. Upsetters from 1" to 9". Worked with most types of Steels. Also good on aluminum Forging. Last position General Superintendent. Write Box 450, STEEL, Penton Bldg., Cleveland 13, Ohio.



TWO 35-TON GENERAL ELECTRIC DIESEL ELECTRIC LOCOMOTIVES

Type LS8-404-E35, Standard Gauge 200 HP, Cummins Engines. Now in use.
HYsinth 2-7400 Mr. H. Spencer
Over 2000 Machine Tools in Stock
Catalog on request
SAS MACHINERY CO.
140 53rd St., Bklyn 32, N. Y.

FOR SALE

Over 400 tons ¼" carbon steel plate in stock. Immediate delivery on tanks 5,000 to 10,000 gallon capacity, or fabricated work.

THE HILYARD COMPANY
P. O. Box 70
Norristown, Pa.

FOR SALE

KEPPA 2000 TON HYDRAULIC FORGING PRESS, bed 5' LR x 36" FB Daylight 111", 60" stroke. Fully equipped. 4 column type, 17" column. Now setup in Navy plant. Recently rebuilt. Price $$$.$$$

EVEREADY; P. O. BOX #638, BRIDGEPORT, CONN.
EDison 4-9471

FOR SALE

Leeds and Northrup Microcarb installation complete and practically new, 20" by 24" deep. Excellent buy. Original owner.

Reply Box 451, STEEL
Penton Bldg. Cleveland 13, Ohio

HELP WANTED

CONTRACT

MANUFACTURING AGENTS

Nationally known metal fabricating company has million dollar new plant and immediate production capacity. Facilities include eyelet and transfer presses, single and double action draw presses, heading machines, plating facilities, automatic buffing and lacquering equipment, plus broad experience and facilities in assembly. Can produce parts or complete products. We seek agents who now call on volume users. Exceptional financial opportunity. Send complete experience record.

Box #455, STEEL

Penton Bldg. Cleveland 13, Ohio

MANUFACTURER'S

REPRESENTATIVES WANTED

to sell nationally advertised line of industrial marking devices. Good territories open. Opportunities permanent and unlimited. Factory backs you up with advertising point-of-sale material and other promotion. In reply, state territory covered, lines handled, types of accounts served. All correspondence kept confidential. Write Box 454, STEEL, Penton Bldg., Cleveland 13, Ohio.

SOAKING PIT COVER CONTROL

REMOTE CONTROLS

Operate cranes, remove pit covers, monitor motors, send warning signals, etc.

TROLLEYPHONES

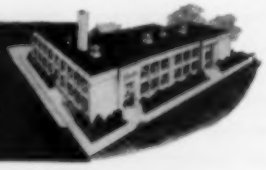
Voice communication between crane cabs and floor, mine locomotives and dispatcher.

AUDIOPHONES

Wired voice systems installed anywhere in industry. Common talking or selective.

Unique Femco control selects and operates up to 50 separate covers — automatically from a control panel in the soaking pit crane! Applicable to many different layouts and types of pits.

GET THE FACTS — SUBMIT YOUR PROBLEM FOR A PROPOSAL.

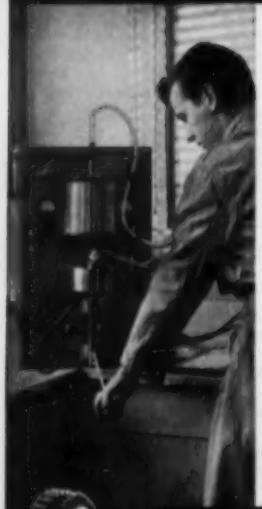


Femco Inc.
IRWIN, PENNSYLVANIA
UNderhill 3-3200

Specialists in Electronic Communication and Automation

Another of the Reasons Behind Brad Foote Quality—

CARBON DETERMINATION



• In hardening gear teeth by carburizing, carbon content and depth of penetration are vitally important. BRAD FOOTE insures precise control of these factors through metallurgical tests with equipment developed specifically for this purpose.

• A test bar goes through the complete carburizing and heat-treating cycle with every batch of carburized gears. Shavings are taken from this bar at carefully measured depths. Chemical analysis of these shavings gives complete and precise data on carbon content and penetration.

• Carbon determination tests are only one of many metallurgical controls that insure the uniform quality of BRAD FOOTE Gears. Metallographic examination, hardness testing, chemical analysis—these are just a few of the quality checks provided by BRAD FOOTE's completely equipped metallurgical laboratories.

• Add these precise controls to specialized production and heat-treating equipment and a wealth of detailed experience in producing gears of all types—you begin to appreciate why BRAD FOOTE can produce better quality gears at substantial savings.

• Find out how BRAD FOOTE quality can save you money. Send us the specifications on your next job for quotation. No obligation of course. BRAD FOOTE MAKES ALL TYPES OF GEARS—IN A COMPLETE RANGE OF STYLES AND SIZES

BRAD FOOTE GEAR WORKS, INC.
1309 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • Olympic 2-7700 • TWX CIC-2856-U

subsidiaries | AMERICAN GEAR & MFG. CO. Lemont, Illinois • Phone Lemont 920 * PITTSBURGH GEAR COMPANY Pittsburgh 25, Penn. • Phone SPalding 1-4600

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When product designs for welded steel

Have twice the rigidty... three times the strength

Yet require less material ...cost less to fabricate

WHY

aren't all your products designed for welding?

THE BETTER WAY

40% more rigid!

. . . yet this machine base of welded steel costs half as much as former cast iron designs.

Ask

THE LINCOLN ELECTRIC COMPANY

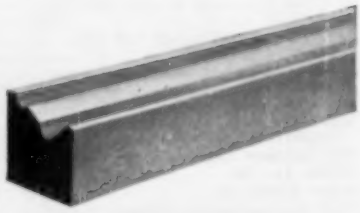
Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

How to save money with special sections

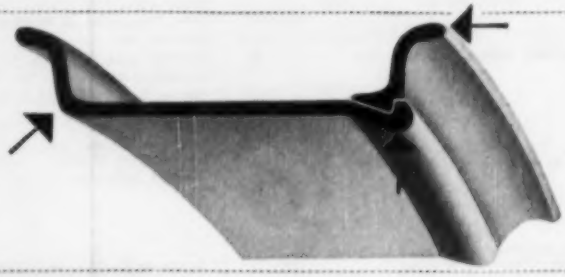
REDUCE YOUR MACHINING COSTS

You can eliminate excess metal by using a special section rolled to your drawings. This often makes rough machining unnecessary. Result: fewer production steps, less scrap, less steel to buy. For example, a manufacturer formerly had to machine away about 17 pct of a small flat bar in making an electric typewriter carriage rail. This precision-rolled special section completely eliminated the machining operations and the resulting metal wastage.



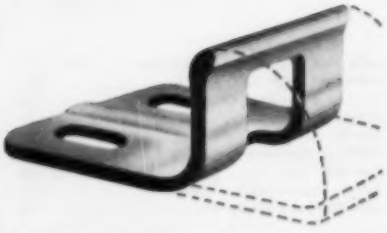
GET STRENGTH WHERE IT'S NEEDED

With special sections your designers can provide extra metal for strength, yet eliminate excess metal for lightness and economy. Tire rims and side rings for automobiles, trucks, buses and heavy equipment are designed with extra steel at points of stress.



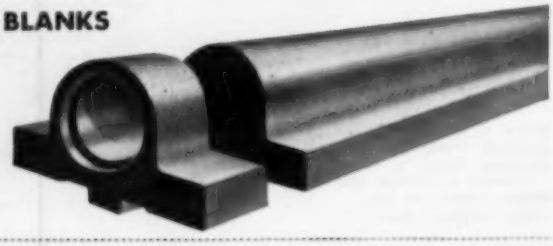
USE PRE-FORMED BLANKS FOR COLD FORMING

Various cold-forming techniques are increasing in popularity because they result in fast, economical production, and in better physical properties. Special sections make ideal cold-forming blanks. This automobile trunk latch part is produced from special section blanks, the critical bulb being pre-formed by hot-rolling, and subsequently cold-shaped in a continuous closed die.



USE BAR LENGTHS INSTEAD OF INDIVIDUAL BLANKS

Special sections make ideal screw machine stock. As in the case of this universal joint trunnion bearing, the bar shape reduces machining and scrap. So, if you have a product that can be produced economically on screw machines, look for additional savings by using special sections as bar stock.



GET FREEDOM OF DESIGN

Surprisingly complex shapes—these window sash sections, for example—can be hot-rolled to your drawings and specifications. A single rolled shape often replaces an entire fabrication, and is stronger, more durable, neater in appearance.

NOW, before you re-design your product or order new stocks of steel, we urge you to look into the many advantages of hot-rolled special sections. We'd be happy to give you full details. Please contact the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Iron ore plant protects 2,000 bearings on crushers and pan feeders with Farval

FARVAL—
Studies in Centralized Lubrication
No. 193

CRUSHING and handling iron ore creates extreme pressures on processing equipment; so proper lubrication is vital to prevent overheated, ruined bearings, with consequent work stoppage, lost production and needless maintenance expense.

To ensure dependable, adequate lubrication of their equipment, Oliver Iron Mining's Sherman Crushing Plant at Hibbing, Minnesota, installed Farval Centralized Lubrication. A total of 2,000 bearings on crushers, pan feeders and screens are served from two Farval automatic pumping stations.

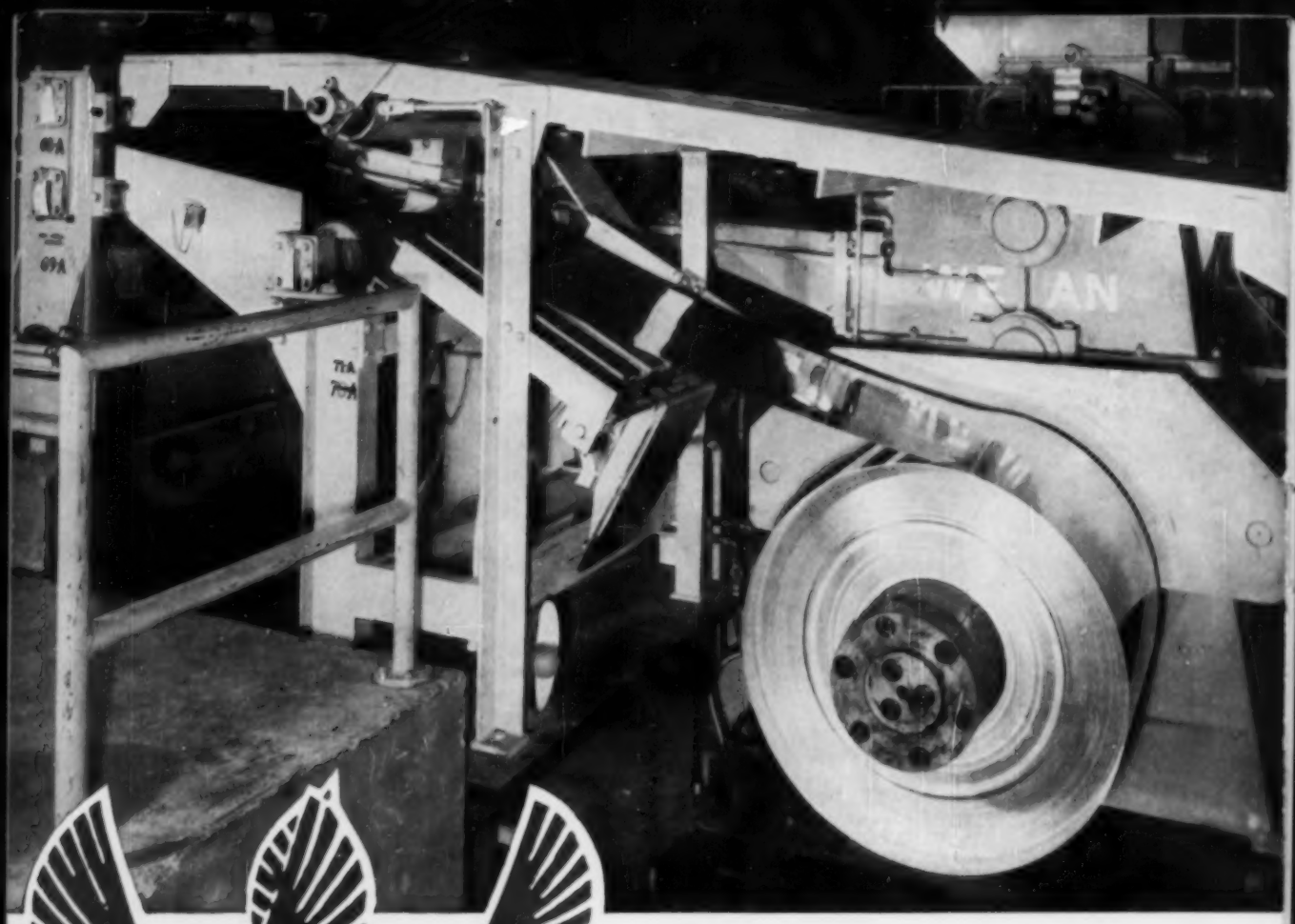
By protecting equipment, Farval saves labor—helps to maintain production schedules. With Farval on the job, oilers are kept out of the dangerous machine areas—a safety factor. Lubricant lines reach bearings even in the most inaccessible places to apply oil or grease in measured quantities as frequently as desired.

Farval can serve any machinery builder or owner—efficiently, economically, permanently. For details, write for Bulletin 26-R. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
In Canada: Peacock Brothers Limited.

KEYS TO ADEQUATE LUBRICATION—
Wherever you can see these Farval manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.

Above—four pan feeders and their screens at the Sherman Crushing Plant. Below—close-up of Farval valves serving a feeder.



WEAN

electrolytic tinning

The Wean Engineering Company is meeting today's demands for equipment to produce tin plate and zinc coated strip steel with light coatings by the electrolytic method; also equipment to produce chemically treated black plate and strip steel. Equipment for coating strip steel with zinc and other materials by the hot dip method is also available.

The WEAN ENGINEERING COMPANY, INC.

WARREN, OHIO

SPECIALISTS IN SHEET, TIN, AND STRIP MILL EQUIPMENT